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GONORRHEA AND SYPHILIS IN MASSACHUSETTS IN 1930*

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LAST year (1930) 11,171 reports of gonorrhea and syphilis were received from 1081 physicians, 26 public clinics and 98 hospitals and institutions. This preliminary analysis is published in appreciation of the coöperation which has made it possible.

These diseases were declared, on the 18th of December, 1917, to be diseases dangerous to the public health and were made reportable directly to the Massachusetts Department of Public Health. Reporting was not limited to "communicable" cases at that time.

The control of gonorrhea and syphilis was "popular" as a war measure, and reports reached a maximum of 13,562 cases in 1919. After the war, control of these diseases no longer held the public attention. Reporting fell off rapidly to 7339 cases in 1925. Toward the close of that year the Department revised its regulations so that reports were to be made directly to local boards of health (as are all other communicable diseases) rather than to the State Department of Public Health. This was consistent with the belief that local boards of health should be responsible, generally, for matters affecting the health of their communities. It was in this revision of the regulations in 1925 that reporting on the basis of "communicability" first appeared, and an attempt was made to define communicability in the regulations.

The results of these changes were as unfortunate as they were unexpected. Reporting immediately decreased and reached the low level of 5941 cases in 1929. The attempt to define communicability led to what was sometimes ridiculous confusion among physicians as to when a given case was communicable. It diverted attention from the importance of treatment to the patient's future and put all the emphasis upon the presence or absence of open lesions or acute symptoms. In addition, the reports were scattered among the offices of 355 local boards of health where they became little more than historical documents. The reports had no immediate administrative value since they did not, except in certain cases, give the name and address of the patient. Consequently they were almost a total loss except for the gross returns made to the State Department of Public Health by the local boards of health.

This situation, together with the conviction, after several years of experience, that it is impossible to define communicability in relation to reporting, led to the return to reporting directly to the State Department of Public Health and to the requirement that all forms and stages of both diseases be reported. The new regulations took effect on January 1, 1930. Results far exceeded expectations. It has been stated that 11,171 reports were received during the first year of the new regulations as compared with 5,941 in 1929.

Every effort has been made to promote as simple reporting as is consistent with usefulness. The four forms which were used in making the various reports have been combined into one form; envelope and postage are provided and additional supplies may be ordered on the form at the same time that the report is made. Thus letter-writing, telephone calls, personal calls, expense of envelope and postage and other inconveniences are spared the physician. A minimum of writing is required, most of the information desired being given by means of a check (√) in the proper space.

Physicians have been careful to give all the information desired. None of the reports failed to state the form of the disease or the sex of the patient, and only 0.7% of them failed to state the patient's age. The community of residence of the patient was the most frequently lacking important information, but only 3.8% of the reports were incomplete on this point. This excellent coöperation has made it possible, for the first time in Massachusetts and, we believe, in the United States, to make a really informative analysis of the reports of gonorrhea and syphilis. The following is in the nature of a preliminary report. A fuller study will be published at a later date.

CASES REPORTED

There were reported 6,974 cases of gonorrhea (4,410 in 1929) and 4,197 cases of syphilis (1,531 in 1929). Reports of gonorrhea were increased 58.1%; of syphilis 174.0% and of both diseases 88.2% over 1929. Reports of syphilis were the highest on record; those of gonorrhea were exceeded only in 1918 (7,681 cases), 1919 (9,435 cases), and 1920 (7,225 cases).

PHYSICIANS REPORTING

From the Directories of the American Medical Association, the Massachusetts Medical Society

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and miscellaneous other sources 5,829 physicians have been identified as practising in this state. Of these, 886 (15.2%) reported gonorrhea, 474 (8.1%) reported syphilis and 279 (6.7%) reported both diseases. Reports were received of either gonorrhea or syphilis or both from 1081 (18.6%).

Various special studies (to be reported later) indicate that about 60% of the physicians in the State treat one or the other disease. Therefore, reports might have been expected from about 3500 of the 5800 physicians. Reports were received from 31% of those who might have reported. (Of 319 physicians who received arsenicals free from the State, only 152 (47.7%) reported syphilis!)

The percentage of physicians reporting varied widely in different parts of the State as well as in communities of approximately the same population. Generally, however, the smaller the community the higher the percentage of physicians reporting gonorrhea and the lower the percentage reporting syphilis. This is probably because most of the general practitioners in the smaller communities treat gonorrhea, while its treatment is mostly in the hands of a smaller group in the large cities, and because syphilis either is less frequently recognized in the small community or because patients with syphilis prefer to go to "specialists," found only in the larger cities, for treatment.

Examples of the wide variation in the number of physicians reporting from cities of about the same size are: Malden 26.4%; Brockton 24.3%; Quincy 18.8%; Lawrence 12.5%; Holyoke 12.3%; Newton 9.2%. The Newton venereal disease rate was 175 per 100,000 population compared to 190 for Malden, 156 for Holyoke, 159 for Lawrence and 149 for Quincy; so that the small number of physicians reporting cannot be a reflection of a low venereal disease rate. Among larger cities the following are examples: Cambridge 29.3%; Lynn 20.2%; Somerville 18.8%; New Bedford 15.4%; Lowell 14.9%; Fall River 8.1%.

As between clinics and physicians (not considering about 1000 cases treated in institutions), physicians reported about half the cases. Clinics and institutions report most of their cases. Studies[1] of 180,000 cases of gonorrhea and syphilis among 25,000,000 population revealed that 80% of the gonorrhea and 57% of the syphilis under medical care at any time is treated in the office of the private practitioner. Assuming that clinics and institutions have reported most of their cases, physicians in Massachusetts should have reported 12,000 cases of gonorrhea and 4100 cases of syphilis, — more than three times the number that they did report. This estimate agrees very closely with conclusions reached in another way already mentioned, that 31% of the physicians who treat reported, and these not all of their cases. At least 15,000 cases of gonorrhea and 7100 cases of syphilis, 22,100 cases in all, should have been reported by physicians, clinics and institutions.

Other studies[2] indicate that not more than half the cases of gonorrhea and syphilis in the population come to medical attention. Conservatively then, if all the cases were under medical care and reported, 30,000 reports of gonorrhea and 14,000 reports of syphilis, a grand total of 44,000 might have been expected! That one per cent. of the population of the State has venereal disease again corresponds with the conclusion reached, in the two studies to which reference already has been made[1, 2], as to the prevalence of venereal disease in the United States.

RESIDENCE OF PATIENTS

In general, the larger the community the higher the reported rate of either disease, although there are notably high rates in many small cities and towns in which most of the physicians reported their cases. Whether there is an actual difference in prevalence or the low rates are due to failure to report or to make a diagnosis, is entirely a matter of conjecture (Table I).

TABLE I

RESIDENCE OF PATIENTS

Size of Community	No. of Communities	Total Population	Rates per 100,000 Population	
			Gonorrhea	Syphilis
Under 10,000	282	745,805	71.4	39.9
10,000-20,000	32	450,296	89.9	46.8
20,000-50,000	25	823,494	121.7	57.2
50,000-100,000	7	461,845	104.2	66.9
100,000-150,000	6*	646,349	163.3	105.1
Springfield	1	150,290	181.2	68.5
Worcester	1	195,539	139.7	94.1
Boston	1	781,266	339.0	233.0
State	355	4,254,884	163.9	98.8

*Lowell included. Population estimated as of July 1, 1930, 99,733.

MIGRATION OF PATIENTS

It is interesting that 2946 patients (27.4% of the total) were treated away from their communities of residence. This migration was, for the State as a whole, inversely proportional to the size of the community (Table II).

Of the 107 communities to which these patients went for treatment, 41 were of less than 10,000 and 64 of less than 20,000 population. Less than 10 of the physicians in these 64 communities are known to specialize to any extent in the treatment of these diseases. Hence migration was not entirely for the purpose of seeking specialists. Yet more than 30% of the patients in these small towns went to local physicians so that the desire to migrate for the sake of secrecy is not universal.

This migration of patients for treatment is

not affected by the size of the community (except in Boston) in the Boston Metropolitan Area*. About 73% of the patients migrated from all these communities (Table III).

TABLE II

MIGRATION OF PATIENTS

Size of Community	Total Cases	Per Cent. Treated at Home	Per Cent. Treated Away from Home
Under 10,000	838	30.8	69.2
10,000-20,000	615	38.0	62.0
20,000-50,000	1471	47.2	52.8
50,000-100,000	790	51.1	48.9
100,000-150,000	1736	66.9	33.1
Springfield	375	92.3	7.7
Worcester	457	95.0	5.0
Boston	4466	95.6	4.4
State	10748	72.6	27.4
Residence not stated	423		

In the State as a whole, 1395 (47.3%) of the 2946 migrating patients went to Boston for treatment from 107 cities and towns. Of these 1395 cases, clinics and institutions treated 55.7% and physicians 44.3%. But since less than one-third of the physicians presumably report their cases it is likely that at least 1900 patients migrated to Boston physicians,—two and one-half times the number which migrated to Boston clinics.

Physicians reported 58.7% of male gonorrhea but only 44.9% of female gonorrhea. Either more women go to clinics than to physicians or clinics more frequently make a diagnosis of gonorrhea in the female.

TABLE III

MIGRATION IN HEALTH DISTRICT OF BOSTON METROPOLITAN AREA

Size of Community	Total Cases	Per Cent. Treated at Home	Per Cent. Treated Away from Home
Under 10,000	2*	0.0	100.0
10,000-20,000	118	25.4	74.5
20,000-50,000	703	26.1	73.9
50,000-100,000	428	26.2	73.8
100,000-150,000	638	29.9	70.1
Boston	4466	95.6	4.4

*Too small to be significant.

THE PATIENTS

Three times as many males as females were reported as having gonorrhea, but only 1.4 times as many males as females were reported as having syphilis. Both diseases are contracted primarily through sexual intercourse. Syphilis is probably more equally diagnosed in the two sexes because of more certain laboratory confirmation. Clinical suspicion of gonorrhea is far more likely in the male than in the female. Consequently it is probable that the same ratio of male to female cases obtains in gonorrhea as in syphilis, and that half the gonorrhea in the female is missed.

In the clinics the ratio of male to female gonorrhea was 2.1 to 1. Among cases reported by physicians the ratio was 4.2 males to 1 female. This also tends to indicate that physicians fail to report or to diagnose many cases of gonorrhea in the female.

Among males, 66.7% of the gonorrhea and 64.9% of primary syphilis was in single males. Among females, 49.6% of gonorrhea and 44.4% of syphilis was in single females. This rather close agreement between gonorrhea and primary syphilis in each of the sexes is significant. It seems to indicate that both diseases are acquired by about the same proportion of single males and about the same proportion of single females.

It is interesting that although a higher percentage of male syphilis than female is diagnosed in the primary stage, the percentage of male and female "early" syphilis (primary and secondary) is essentially the same (Table IV).

It is remarkable that our findings for a year's reports continue to agree so closely with those of the United States Public Health Service[1] in its summary of the many one-day surveys made among 25,000,000 population. In that summary it is stated that 30.5% of the cases of syphilis under medical care are in early and 69.5% are in late stages of the disease.

AGES OF PATIENTS

Both diseases are predominant in youth and both become prevalent earlier in the female than in the male (Tables V and VI).

It is noteworthy that 9.3% of males and 30.5% of females were under 20 years of age; that 41.8% of males and 60% of females were under 25 years of age, and that 66.6% of males and 78.3% of females were under 30 years of age!

DIAGNOSIS OF PRIMARY SYPHILIS

It is gratifying to discover that the darkfield was used in the diagnosis of 44.1% of the 535 cases of primary syphilis. Serology alone was depended upon in 44.5% of the cases. It is hoped that eventually some laboratory confirmation was obtained for the 50 cases (9.3%) which were reported as "diagnosed" by clinical examination only. In 2.1% of the reports of primary syphilis, the method of diagnosis was not stated.

*For the Boston Metropolitan Area we have used our arbitrary Health District No. 2 which includes Arlington, Belmont, Boston, Brookline, Cambridge, Chelsea, Dedham, Everett, Malden, Medford, Milton, Needham, Newton, Quincy, Revere, Somerville, Waltham, Watertown, Wellesley, Weston, Winthrop.

TABLE IV

PER CENT. OF SYPHILIS BY SEX AND STAGE (4197 CASES)

Sex	Primary	Secondary	(Total Early)	Late	(Neurosyphilis)	Congenital	All Forms
Male	16.7	18.7	(35.4)	60.0	(16.8)*	4.6	100.0
Female	6.7	29.8	(36.5)	53.7	(6.9)*	9.9	100.0
Both Sexes	12.6	23.2	(35.8)	57.7	(12.7)*	6.5	100.0

*Included in "Late" Syphilis.

TABLE V

PER CENT. OF GONORRHEA BY SEX AND AGE (6974 CASES)

Age	0-14	15-19	20-24	25-29	30-39	40-49	50 and over	Total
Male	1.0	8.3	*32.5*	*24.8*	*22.8*	7.2	3.4	100.0
Female	11.7	*18.8*	*29.5*	*18.3*	*14.7*	4.7	2.3	100.0

TABLE VI

PER CENT. OF SYPHILIS BY AGE AND STAGE

Male (2468 cases)

Age	0-14	15-19	20-24	25-29	30-39	40-49	50 and over	Total
Primary	0.02	7.8	*25.1*	*26.4*	*24.5*	9.6	6.0	100.0
Secondary	1.1	4.8	*26.8*	*21.9*	*26.7*	11.8	6.9	100.0
Late	0.0	1.0	4.3	8.9	*25.0*	*27.8*	*33.0*	100.0
Congenital	*67.4*	*13.0*	*10.9*	6.5	2.1	0.1	0.0	100.0

Note that 59.3% of primary syphilis and 54.6% of secondary syphilis (56.9% of all early syphilis in the male) is in men under 30 years of age, compared with 66.6% of gonorrhea in males under 30 years of age.

Female (1729 cases)

Age	0-14	15-19	20-24	25-29	30-39	40-49	50 and over	Total
Primary	4.5	*22.4*	*32.8*	*14.9*	*19.4*	4.5	1.5	100.0
Secondary	0.3	*12.7*	*31.6*	*20.8*	*20.1*	8.7	5.8	100.0
Late	0.0	5.3	11.4	12.7	*29.2*	*21.1*	*20.3*	100.0
Congenital	*50.3*	*24.2*	*11.0*	8.0	4.0	0.5	2.0	100.0

Note that 74.6% of primary syphilis and 65.4% of secondary syphilis (67.2% of all early syphilis in the female) is in women under 30 years of age, compared with 78.3% of gonorrhea in females under 30 years of age.

LAPSED CASES AND SOURCES OF INFECTION

There were 2476 cases reported with name and address of the patient. Of these, 2364 were reported as having discontinued treatment prematurely (53.5% gonorrhea and 46.5% syphilis) and 114 as "sources of infection" (65.7% gonorrhea and 34.3% syphilis). Physicians reported only 229 (10.2%) of this total; clinics reported 89.8%.

It is impossible to determine what relation these cases reported by name have to the 11,171 reports of cases for many of them may have been under medical care since 1929 or before and not included, therefore, in this year's reports of cases.

Boards of health in 109 cities and towns have reported upon their investigations of 2238 of these 2476 cases. Boston reported upon 1371 of which 35.6% could be located, 64.4% being lost because of incorrect name or address or removal of the patient to an unknown address. The remaining 108 boards of health found 65.8% of their 867 cases, losing only 34.2%, almost the reverse of the result in Boston where the clinic type of population is apt to be far more transient.

SUMMARY

1. One thousand and eighty-one physicians, 26 public clinics and 98 hospitals and institutions reported 11,171 cases of gonorrhea and syphilis in 1930, an increase of 88.2% over 1929 and exceeded only in 1919 (13,562 cases). There is no reason to suppose that this indicates an actual increase in prevalence although there are those who feel that in late years this has been the case.

2. Less than a third of the practising physicians whom it is estimated saw cases of these diseases, reported them, and less than half of the doctors using State arsenicals reported syphilis.

3. In general, the smaller the community the higher the percentage of physicians reporting gonorrhea and the lower the percentage reporting syphilis.

4. As between public clinics and physicians, the latter reported about half of the cases. Since clinics report most of their cases and physicians not more than one-third of the cases under private medical care, it is estimated that at least 22,000 cases of gonorrhea and syphilis should have been reported from all medical sources. Further, it is estimated that as half the cases in the population do not come to medical attention, there were at least 44,000 cases of gonorrhea and syphilis in Massachusetts in 1930.

5. In general, the larger the community the higher the reported rate of either disease.

6. More than one-quarter of the total cases went "out of town" for treatment. The percentage of migration was inversely proportional to the size of the community of residence (from 69.2% in towns under 10,000 population to 4.4% in Boston). This does not hold for the Boston Metropolitan area where about three-quarters of the patients migrated regardless of the size of the community of residence. Apparently, therefore, neither secrecy nor "specialists" entirely explain this migration. A study of migration for the treatment of other diseases might prove interesting.

7. Physicians reported 58.7% of male gonorrhea but only 44.9% of female gonorrhea. Either more women with gonorrhea go to clinics than to physicians or physicians fail to diagnose much of this disease in women.

8. Three times as many males as females were reported as having gonorrhea, but only 1.4 times as many males as females were reported as having syphilis. In the clinics the ratio of male to female gonorrhea was 2.1 to 1. Among cases reported by physicians the ratio of male to female gonorrhea was 4.2 to 1. This again tends to indicate that physicians fail to report, or to diagnose, much of the gonorrhea in women.

9. Single males contributed about two-thirds of the recognized gonorrhea and primary syphilis in the male. Single females contributed a little less than one-half the recognized gonorrhea and primary syphilis in the female.

10. Although 16.7% of male syphilis and only 6.7% of female syphilis was diagnosed in the primary stage, more than one-third of both male and female syphilis was diagnosed in the "early" (combined primary and secondary) stages.

11. That these diseases are primarily problems of adolescents and young adults is emphasized by the fact that under 30 years of age we find over half the cases of "early" syphilis and two-thirds of the gonorrhea in males, and two-thirds of the "early" syphilis and more than three-quarters of the gonorrhea in females.

12. The darkfield was reported as used in less than half of the 535 cases of primary syphilis. "Diagnosis" by clinical examination only, was reported in 50 cases of primary syphilis!

13. Cases reported by name as lapsed or sources of infection numbered 2476, of which only one-tenth were reported by physicians.

14. Boards of health in 109 cities and towns reported on their investigations of 91% of the 2476 cases. Boston could locate only one-third of its 1371 cases owing to the transient clinic population. The other 108 boards of health located two-thirds of their 867 cases.

REFERENCES

1 Bulletin of Venereal Disease Information, U. S. P. H. S. Vol. XI, No. 12, 1930.
2 Philadelphia Hospital and Health Survey, 1929.

KÜMMELL'S DISEASE*

BY FREDERICK W. O'BRIEN, M.D.†

THERE has been a great deal of loose writing about this so-called disease due, in part, to a paucity of pathologic control as well as to an apparent desire to claim as the morphologic expression of the syndrome first described by Kümmell every wedge-shaped vertebral body seen roentgenographically accompanied by a kyphos which followed injury.

It was in 1891 that Professor Herman Kümmell of Hamburg, at the sixty-fourth meeting of the Society of German Biologists and Physicians at Halle, reported a new symptom complex which he called "rarefying osteitis of the vertebrae". In 1895, in the *Deutsche medizinische Wochenschrift*, he made a brief report of this condition and in 1899 his assistant, Schulz, made an extended one under the title, "Traumatic Spondylitis." It was 1921 before Kümmell published anything again on the so-called disease which came to bear his name. At this time he reviewed the vicissitudes of his symptom complex with the caption, "Post Traumatic Disease of the Vertebrae"[1] and combated the criticisms (annihilating he called them) of his confrères, protesting that the first description of his symptom complex still held good and that the cause and the course of the disease were the same as outlined thirty years before.

The cause of the disease is always trauma, Kümmell writes, either by direct force against the spinal column or the impaction of a heavy object on the shoulders and neck of the patient. Further results of such an injury are severe pain

*From the Roentgen Department of the Cambridge City Hospital. Read at Yale University Hospital, New Haven, May 7, 1930; Annual Meeting Massachusetts Society of Examining Physicians, Boston, May 14, 1930; Connecticut State Medical Society, Hartford, May 23, 1930.

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in the affected portion of the spinal column, of which the patient begins to complain two or three days after the accident. The pain gradually disappears and the patient invariably takes up his previous occupation. After a somewhat longer time, months and often years, severe pains in the spinal column occur. Dependent on the position of the injury, there appear also neuralgias in the regions of the various intercostal nerves and slight disturbances of motion in the lower extremities. The gait becomes uncertain and if the patient is now examined, one finds, after weeks and months of freedom from symptoms, a definite kyphos and gibbus.

The location of the disease in all his cases was the thoracic spine and he notes that the most prominent vertebra and the adjoining vertebra above and below were extremely sensitive to pressure as in the acute stage of tuberculosis of the spine, that when these patients are suspended from the head, the kyphos usually disappears although the gibbus remains. Since a deep-seated destruction of one or more of the vertebrae has occurred, the deformity can no longer be straightened by treatment.

Briefly, he says, we have here a trauma, often insignificant, which affects the spinal column either directly or indirectly and its immediate manifestation disappears after a few days, only to reappear after months of well-being in the form of a rarefying process of the vertebra accompanied by atrophy. In this disease suppuration never occurs as in the case of tuberculous spondylitis, nor is hypertrophy of the bony mass observed as in the case of the luetic process or new growths, nor are there other changes as in arthritis deformans.

He changed the name of the disease several times because of the doubtful etiology of the condition. The first name chosen by him, "rarefying osteitis of the vertebrae" was justified, he believed, because it emphasized the disappearance of the vertebral spongiosa, which takes place gradually after the trauma. The name proposed by Schulz, "traumatic spondylitis" was probably not justified since the process was not inflammatory but merely traumatic. "Post-traumatic disease of the vertebrae," he thought more appropriate since that is not based on any disputed pathologic process but on the unquestioned cause of the disease, trauma, without which the condition never occurs.

A fracture or cracking of the vertebra due to the trauma can be ruled out, he says, as, in the first place, the injuring force was in most cases too weak to bring about such a result and, in the second place, the temporary pain does not permit the assumption of so severe an injury as fracture of one or more vertebrae. It must, therefore, be assumed that the vertebrae which were affected by the relatively light blow or compression were so disturbed in their nutrition that an atrophy of adjoining vertebral surfaces resulted, which steadily progressed from the time of injury until the institution of treatment. This is, therefore, a purely local condition that has nothing in common with a constitutional disease or a neuropathic infection.

Kümmell goes to great length to prove that posttraumatic disease of the vertebrae is not a compression fracture, yet in controverting Wullstein, who attacked the disease as a separate entity, Kümmell concedes that it occurs as a result of impacted compression fracture, but asserts it also occurs as a result of traumatic influences which often cannot be demonstrated. He calls to his aid the experimental observations of Lange of Copenhagen, who took ten thoracic vertebrae from recent autopsies and subjected them to a pressure in a machine such as is used by engineers to test the strength of materials. His results were as follows, quoted by Kümmell:

Each vertebra breaks with a certain pressure, but before the break occurs definite changes take place.

Pressure on the vertebrae shows no demonstrable changes as long as a certain limit is not exceeded.

If this limit is exceeded, a shortening of the vertebrae occurs; the vertebrae are measurably compressed.

If the pressure does not exceed the limit, the shortening disappears after the release.

If the pressure exceeds the limit, the deformity does not completely disappear. The compressed vertebrae recover somewhat but never reach their former height.

Besides the amount of pressure, the length of time plays an important part in this permanent shortening. The same pressure which, after short action, is followed by complete restoration, produces an irreversible shortening if the action is prolonged. According to this report, the vertebrae of the adult act the same as those of a child: the vertebrae of a healthy man the same as those of the constitutionally weakened individual. On the basis of his observations, Lang speaks of an osteomalacia traumatica. He explains the traumatic changes in a vertebra and the neck of the femur as due to diminution of the bone caused by the trauma but without fracture. His interesting experiments prove, says Kümmell, that the vertebrae, particularly the lower thoracic and upper lumbar, may be injured by trauma without simultaneous fracture and that their original shape is recovered, provided the pressure is not too great.

"That such processes," Kümmell continues, "in the living vertebrae are not without consequence is easily understood, although at first it is not possible to demonstrate the changes by x-ray. It is obvious, he goes on to say, that a compression of a vertebra such as described above, even though it recovers its former shape, must cause a disorganization of the delicate framework of the bone and produce extravasations of blood in it. A compression fracture or an impacted fracture is, therefore, not necessary to the production of posttraumatic vertebral changes. To effect a gradual disappearance of

the bony framework it is sufficient to have a forcible compression of the spongiosa of the vertebra. This is the process as I have first described it and as it doubtless occurs in many cases in addition to those in which definite fracture or fissures of the vertebra are demonstrable."

How there can be disorganization of the delicate framework of the bone and compression of the spongiosa without fracture secondary to external trauma is not clear. What he undoubtedly means is that there is no immediate demonstrable fracture such as one would readily diagnose clinically from compression cord symptoms or by x-ray. By definition, a fracture is the breaking, either partial or complete, of a solid body by force.

Kümmell's disease, so-called, is always accompanied by a wedge-shaped vertebral body so that ultimately there is always a shortening of the vertebra, proving by Lang's own experiments that pressure on the vertebra must have exceeded the limit so that irreversible shortening has occurred.

It is conceivable that, on the first x-ray examination, fracture of a vertebral body may not be determined, as may be the case in fracture of the neck of the femur. Even today, with the very best x-ray technic, a fracture of the femoral neck may not be immediately demonstrable, one's suspicion being confirmed when later absorption of the neck has taken place. Unless the network of the spongiosa has been broken by injury or diseases, there is no reason to assume that a vertebra will collapse.

The sharply defined symptom complex of posttraumatic vertebral disease (Kümmell's disease), he writes in résumé, comprises three stages:

1. Trauma is a necessary preliminary to the disease, either direct or indirect, by pressure on neck and shoulders or wrenching and crushing of the vertebrae due to jumping from vehicles. Very often the injury is produced by sitting down with great force and the patient soon forgets the actual injury. The stage of more or less severe shock which follows the injury disappears usually very quickly. Local pain in the spine and temporary signs of involvement of the cord are sometimes present.

2. The stage of relative well-being and resumption of the patient's occupation. The duration of these first two stages depends more or less upon the nature and kind of the injury. Some patients are never wholly free from pain, but after the first few days they usually manage to resume their work, although in a limited way. Others, on the other hand, after a few days of discomfort, resume their occupation, which is often difficult and laborious. Differences in the nature of trauma, extent of the injury and resistance of the individual, of course, prevent any hard and fast rules for this period of well-being.

3. The stage of gibbous formation and the return of local pain in the injured vertebra. This last stage, which presents a complete picture of posttraumatic vertebral disease, is easily diagnosed clinically as well as by x-ray.

It is erroneous, he says, to look upon the rarefying osteitis as an independent symptom complex, just as it is erroneous to look upon the compression fracture as a single cause, even in those cases where the x-ray shows such a process to be present beyond question. The various gradations of the effect of the trauma must be considered to be the etiological factor.

Here it appears that he is talking about cause and effect, confusing proximate and approximate, mediate and immediate, in an endeavor to make the etiological factor something unique.

The pathologic-anatomical support which Kümmell adduces is not convincing. He refers to an autopsy specimen described by Ludloff in which the two last lumbar vertebrae were studded with small hematomata, although no fracture was present. The pathologist, Ponfick, remarked, "This is a case which *almost certainly would have* led to a so-called Kümmell's kyphosis."

A pathologic report by Hattemer in Garre's clinic is next utilized. A patient 61 fell, a few years before, on the ice and almost two years later had another accident. Pain and disability increased until she was unable to move her extremities. The hospital record reports a definite gibbus of the ninth and tenth thoracic vertebrae; the pathological diagnosis is "rareficatio vertebrarum dorsalium et lumbalium; no compression of the vertebrae was observed".

Kümmell then proceeds to quote Hattemer's description of what is necessary for the repair of fracture of the vertebra and why osteitis traumatica occurs in untreated fracture, which is beside the point if Kümmell's disease is not fracture.

A case reported by Wiegel is then in order. A man forty-one lifted a heavy box and felt severe pain in the lower portion of the spinal column; he died six months later of an intercurrent disease. On autopsy a cavity the size of a hazel-nut was found in the first lumbar vertebra, in which the spongiosa was replaced by a jelly-like substance. "It appears that the patient died," Kümmell adds naïvely, "before further degeneration of the spongiosa and formation of a gibbus could take place."

The last pathologic specimen Kümmell utilizes is one demonstrated by Rumpel, in 1898, in which the first lumbar vertebra was wedge-shaped and united to the adjoining vertebra by a bony mass, which, he said, was the result of compression fracture without dislocation.

Of the four autopsy specimens one was frankly a compression fracture and three might have been as many things again.

Pbalthzard, in 1914, in what has been described by Jones as the first complete report of postmortem findings recorded in surgical annals on Kümmell's disease, reported a case which

resulted in the death of the patient six months after the accident. The necropsy findings showed a marked spinal scoliosis with a compression fracture of the anterior portion of the body of the eleventh dorsal vertebra. Nevertheless, Jones declares, the exact pathogenesis of this disease is still theoretical.

Most writers have grouped recognized vertebral fracture, with or without delayed symptoms, with a description of Kümmell's disease.

Jones (loc. cit.), in 1923, reviewed some 106 cases in the literature, including one of his own, under the title, "Compression Fracture of the Spine Developing Delayed Symptoms (Post-Traumatic Spondylitis or Kümmell's Disease)". He did not mention a paper by Wallace of Pittsburgh, which he had discussed one year before. As far as I am able to learn, it is the largest single contribution of anyone in the literature. Wallace[3] described in detail eighty-two personal cases of fracture of the spine, some forty-seven of which were not diagnosed until the appearance of delayed symptoms. Of the eighty-two cases of fracture of the spine recorded by Wallace, in sixty-seven a definite history of forcible flexion of the spine was given; twenty cases were promptly recognized, 75% of which showed paralysis; forty-seven cases were undiagnosed, 6% (3 cases) of which had more or less paralysis. The shortest elapsed time of the undiagnosed cases was 25 days, the longest 1,045 days, the average 311 days. A single body was crushed in 60 cases, more than one in twenty-one cases; the first lumbar in 33 cases, or 41%; and the second lumbar in 19 cases, or 23%. The ages ranged from 16 to 65 years, the average being 39; nearly all were coal miners.

Kümmell recognized that compression of a vertebra may result from indirect as well as direct injury, but seemed to feel that great force was necessary for fracture and only mild trauma for his disease. Yet it is evident that the character of the force is only part of the picture. The character of the body receiving the applied force and its relationship anatomically and physiologically at the time of the trauma come to the foreground.

Stern[4] declares that the cause of spinal fracture is to be found sometimes in unusual muscle effort; that the most frequent cause of vertebral fracture is indirect violence, which gives rise to a hyperflexion or hyperextension of the trunk, or to a shortening of the longitudinal axis of the column beyond the limits of its elasticity. When these factors are combined with lateral bending, more or less rotation or tilting of the body of the injured vertebra takes place.

Those of us who have had the experience of a busy casualty clinic realize how relatively mild trauma, usually indirect, may cause fracture of a vertebra. Cardis, Walker and Olver[5] report an impressive case of a man, aged 28, riding a motorcycle, when he was struck on the left foot by a car which unexpectedly emerged from a side street on his left. Only the patient's foot was struck, his back was not directly injured and he was not unseated. He was certainly jarred severely, but he resumed a twelve-mile journey on his bicycle. One week after the accident, the patient noticed a lump in the small of the back and associated pain and tenderness. A skiagram showed a wedge-shaped collapse of the second lumbar body.

In shortening of the longitudinal axis of the vertebral column, fracture results because the limit of compression has been reached and the bony segments have been crushed by the force. Such fractures usually occur in the region where the spine is least flexible as in the dorsal region.

Fractures from the compression of hyperflexion or hyperextension are most commonly found in regions where flexible segments join the more rigid portions, as in the dorsal-lumbar, dorsal-cervical, cervical-occipital regions.

Sever's[6] cases of compression fracture of the vertebrae followed severe violence, usually a crushing force applied through the long axis of the spine or while the spine was flexed. All were diagnosed late. One reason for late diagnosis given by Hartweld[7] is that the force that causes vertebral fracture is so great that in at least one-third of the cases other severe injuries accompany the spinal fracture, and that in many instances, especially where no paralyses are present, these complicating injuries are so apparent that no thought of the possibility of a vertebral fracture enters the examiner's mind at first; if later, the patient complains of back-ache, his complaints are not heeded enough to give his back an examination and he is appeased by being told that he ought to expect a back-ache after the jolt that he got.

Froelich of Nancy, in 1920, quoted by Sinding-Larsen[8], described a number of cases of traumatic spondylitis; in two, the radiographs, both front and side views, showed the presence of horizontal fissures through the middle of several bodies, with or without deformation (Plate 1). According to Froelich, the fissures were due to numerous trabecular fractures.

Hahn[9] (1922) was the first to recognize the blood vessel origin of this slit-like appearance often observed on lateral skiagrams of the spine of young individuals (Plate 2). He believed this slit-like appearance represented the x-ray projection of nutrient foramina and was to be observed only during a short period of adolescence, when an increased blood supply was present.

Hanson[10] of Stockholm has made a detailed study of this problem based on 360 pathologic, and 40 so-called normal (6 months to 19 years) cases and 8 full term foetus. He studied the course of the vertebral arteries by injecting Teischmann's substance into the carotid or the aorta of foetal bodies and children at different ages. By this method he succeeded in demonstrating arteries, even of very fine calibre, on

skiagrams (Plate 3) as well as on anatomical preparations. A study of these preparations shows, he says, that the arteries are not concerned with the peculiar vertebral formations described above, their arrangement having been found as follows:

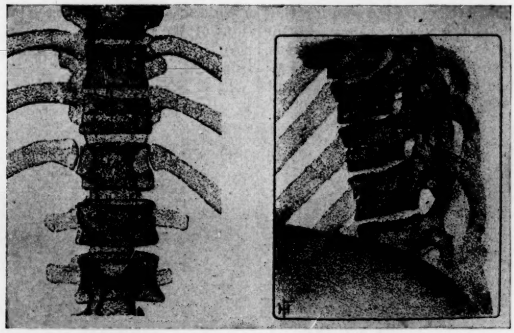

PLATE 1. From "Chirurgie Reparatrice et Orthopedique", after Sinding-Larsen.

A small artery, a direct branch of the aorta, passes backwards along each side and close to the middle of the vertebral body, to which it gives off small branches, having reached its dorsal aspect. Passing through the intervertebral foramen, small branches are supplied to the arch, while the main branch continues to the posterior aspect of the vertebral body, piercing this near the middle line.

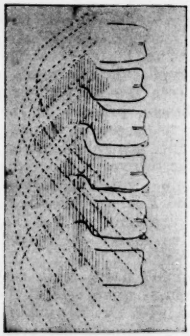

PLATE 2. From Hahn's original article. See reference No. 9.

The outcome of his investigation, then, is that the radiological appearance of the vertebral body, described by him as an excavation in the middle of the anterior margin of the body, is a vein running across, close underneath the periosteum and perichondrium respectively, surrounded on the deeper side by a quantity of bone marrow.

Hanson states that from late foetal life till the age of two the vertebral body appears on a lateral skiagram as divided into three plates, one upper and one lower of denser nature and one lighter between these. In the anterior margin of the latter there is seen an excavation in the shape of an amputated cone with its base directed forwards. This excavation is occupied by a vein, running close under the perichondrium and periosteum respectively, and continuing by a stem on each side of the middle line towards the foramen vertebrale. The excavation disappears during the second year of life except in the lower 5-7 dorsal vertebrae and in L 1 and L 11, where it remains till the age of 14. The canal formations can appear in different forms

PLATE 3. Showing arterial supply to vertebra, after Hanson.

during the age of 2-14, as is shown in (Plate 4) Figs. 2, 3, 4 and 5.

In some individuals the vertebral body has a staircase-like outline at its two anterior corners, shown in Fig. 6. The epiphyses are formed in these staircase-like formations (Fig. 7). The author has found this kind of vertebra in individuals with rounded backs and is assuming that this peculiar shape of the vertebrae may be the anatomical foundation of some cases of kyphosis.

Hanson found epiphyses in a child, aged 6; they have previously been stated not to occur

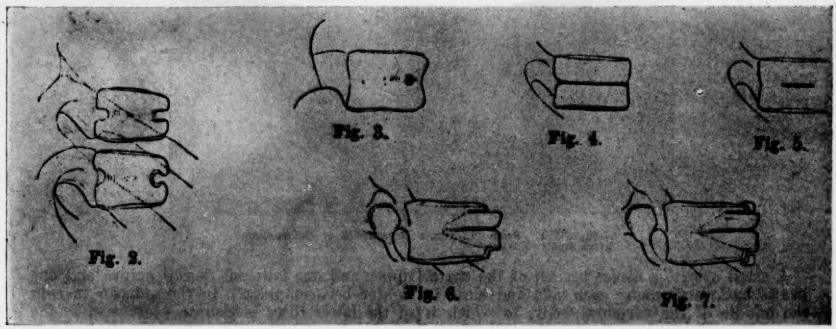

PLATE 4. Showing venous channel and types of vertebral bodies, after Hanson.

before the age of 11. He found the described canal formations in all cases examined, in foeti of 35 cm. length and in individuals till the age of 14.

If the wedge-shaped vertebra seen in Kümmell's disease is the result of fracture, it may be asked, why not callous formation and a return to normal?

The progress of any given case of fracture of the spine is necessarily very slow as the formation of true callus in the vertebral osseous tissue is very slight in comparison with that formed in the long bone. True union often does not take place. This is most frequently seen in compression fractures of the bodies. Absorption and rarefaction of the bone often takes place. After the erect posture is assumed, a kyphosis slowly develops over the seat of fracture and the afflicted segment sags forward.

Kolodny[11] has shown that an adequate blood supply of the periosteum is essential for normal union of fractures and that periosteal callus plays a far greater rôle in the union of fractures than endosteal callus.

Hanson's work, already referred to, has demonstrated the poverty of blood supply to the vertebra, thus rendering conditions ideal for non-union and consequent collapse of the vertebral body. If the injury to the spine has been slight and immobilization and hyperextension employed promptly, a relative return to normal will occur. Although some degree of compression may remain, there will not be collapse.

If, in addition to the lesions demonstrable by x-ray, there are present (as Reuter, working in Kalisko's Medical Legal Institute in Vienna, showed) numerous smaller ones distributed over a wide area such as fissures of the discs, lacerations of the ligaments, etc., these may later give rise to a condition of chronic ankylosis of the spine.

If it is not fracture, what may it be? Not tuberculous spondylitis; not arthritis deformans; nor lues, according to Kümmell. It is perfectly evident that not every wedge-shaped vertebra with kyphos is the result of fracture. I have just seen the x-ray films of a case of Hodgkin's disease, primary in the spine with characteristic wedge-shaped vertebra and kyphos undiagnosed until general glandular enlargement appeared after two years. Osteomalacia of von Recklinghausen, osteochrondritis juvenilis, epiphysitis and Kohler's disease, each has been offered in explanation. If it is any, or all, of these, it is no longer the specific entity of Kümmell.

In my opinion, based on a rather unusual series of traumatic spines seen at the Cambridge City Hospital with Dr. Benjamin Godvin and followed roentgenographically over a period of years, what Kümmell has described is an unrecognized, hence untreated, fracture of the spine; unrecognized because of no cord symptoms, inadequate or no roentgen examination and the erroneous belief that if one can walk and has suffered only a slight (mild) trauma, one cannot have a fracture of the spine.

Kümmell's symptom complex (one may hardly call it a disease) is a distinct clinical entity. His observations have put the surgeon on guard against slighting ambulant cases of back injury.

Kümmell plainly states that the largest part

of his observations and communications was made at a time when Roentgen's discovery was as yet unknown, or at least not practically available. Even today, writing in 1921, he says that the number of x-rays which could give help in clearing up the causation of the disease is not great. This lies in the nature of the disease, since a patient only rarely has an x-ray taken shortly after the accident as the first painful stage is quickly over and a feeling of improvement and relief obtained. No x-ray can be found in the literature which was taken shortly after the trauma and which might be compared with a later picture. Satisfactory x-ray negatives of

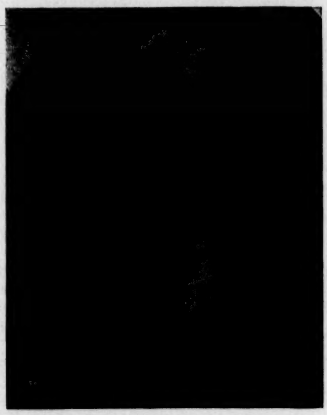

PLATE 5. Male, aged 60, struck on back by stable door; no apparent injury. First x-ray examination 2/14/24 showed no definite evidence of fracture.

the spinal column in the antero-posterior projection, as well as the lateral, have been a development of the last few years.

Even in the fifth edition of Kohler's[12] excellent monograph, translated in 1928, speaking of the lumbar vertebrae one reads: "These are usually viewed in dorsal negatives, occasionally, too, an oblique negative is helpful and in children even a profile negative. Even in the adult satisfactory profile negatives can often be secured."

With our present x-ray equipment and technical methods one must do a lot of explaining if one fails to produce satisfactory negatives of the spine in any projection. Improved roentgen technic and diagnosis is the explanation of the infrequency with which one now encounters Kümmell's syndrome. Early in the course of the patient's complaint, if not at the time of injury, adequate x-ray studies are now made, which usually reveal the extent of the trauma, and a diagnosis of compression fracture can be promptly made.

Appropriate orthopedic treatment, such as hyperextension, instituted early, will prevent complete collapse of the vertebral body in some

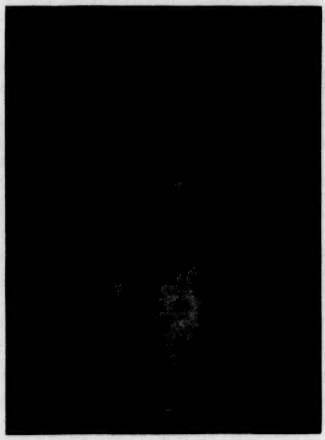

PLATE 6. Same patient reëxamined 3/11/24 showed definite x-ray evidence of fractures of 1st, 3rd and 4th lumbar vertebrae.

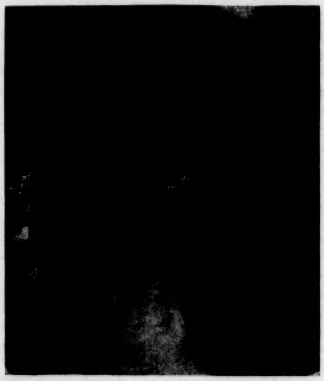

PLATE 7. Same case, end result; examined 2/15/28.

cases and definitely forestall gibbous formation.

A so-called negative x-ray report should not be accepted wholeheartedly. The term negative should be dropped from the nomenclature of the roentgenologist. Plate 5 is a photostatic reproduction of a lateral roentgenogram of the lumbar spine of a man, aged 60, struck in the back when a barn door came off its hinges. Because of "cupping" seen in the superior articular sur-

face of the 3rd lumbar vertebra and my particular interest in Kümmell's syndrome, this case was followed carefully and, much to my surprise, on reëxamination in less than three weeks, the 1st lumbar vertebra was found wedge-shaped, the superior articular surfaces of the 3rd and 4th lumbar vertebrae compressed and pitched forward (Plate 6). Four years later, because of adequate orthopedic treatment, there is no kyphos or gibbus (Plate 7).

Because of early diagnosis and proper treatment the gibbus of Kümmell's syndrome should become as occasional as the hunchback of Pott's disease.

REFERENCES

1 Kümmell, H.: Die postraumatische Wirbelerkrankung (Kümmellische Krankheit). Arch. f. klin. Chir. 118: 876-901, 1921.

2 Jones, F.: Compression fracture of the spine, developing delayed symptoms. J. A. M. A. 81: 1860-1866, Dec. 1, 1923.

3 Wallace, J. O.: Crush fractures of the spine. J. Bone & Joint Surg. 5: 28-69, Jan. 1923.

4 Stern, W. G.: Fracture of the spine without cord involvement. Cleveland M. J. 16: 251-258, Apr. 1917.

5 Cardis, J., Walker, G. F. and Olver, R. H.: Kümmell's disease. Brit. J. Surg. 15: 616-625, Apr. 1928.

6 Sever, J.: Compression fracture of the lumbar vertebrae. Surg. Gynec. Obst. 22: 338-343, Mar. 1916.

7 Hartweld, J. T.: The diagnosis of fractures of the spine. Colorado Med. 16: 78-83, Apr. 1919.

8 Sinding-Larsen, M. F.: A contribution to the diagnosis in diseases of the vertebral column. Acta Radiol. 5: 207-217, 1926.

9 Hahn, O.: Scheinbare Spaltbildung der Wirbelkorper in der Adoleszenz. Fortschr. a. d. Geb. d. Röntgenstrahlen 29: 211, 1922.

10 Hanson, R.: On the development of spinal vertebrae, as seen in skiagrams, from late foetal life to the age of fourteen, Acta Radiol. 5: 112-126, 1926.

11 Kolodny, A.: The healing of fractures. J. Bone & Joint Surg. 5:698-711, Oct. 1923.

12 Kohler, A.: Roentgenology. Wm. Wood & Co., N. Y., 1928.

MYOCARDOSIS—THE FAILING HEART OF MIDDLE LIFE

II. Early Clinical Manifestations

BY ALBERT S. HYMAN, M.D.,* AND AARON E. PARSONNET, M.D.*

THE favorable reception accorded our short essay upon "Myocardosis"[1] and the widespread interest apparently aroused both in this country[2, 3, 4] and abroad[5] by the introduction of a newer conception of heart disease, as it is seen in the middle and advancing age periods, has prompted us to a deeper consideration of this problem.

Reviewing the subject from a retrospective angle, it is strange that a misnomer like *chronic myocarditis* should have withstood so long and remained so firmly intrenched in the face of the rapid progress of scientific medicine. General dissatisfaction with the term *chronic myocarditis* has been subconsciously voiced by many authors in the past decade; from time to time this term has been employed with an almost apologetic gesture, the user feeling its marked inadequacy. With the boundaries of cardiovascular pathology continually widening, it was inevitable that a term such as *chronic myocarditis*, which formerly was sufficient to encompass the entire subject, should sooner or later be outgrown.

With a fuller appreciation of the significance of the degenerative changes normally present in every individual reaching the half-way mark of his allotted years, the true diseases of the heart and blood vessels stand out in sharp contrast. The differentiation of the wearing-out process and the alterations affected by disease becomes a special problem for the clinicians of today. The important rôle played by the aging process and the normal physiologic breakdown in the structures of the cardiovascular system during the middle and advanced age periods has been shown by such able workers as Cohn, Herrick, Balfour, and Cabot to vie in seriousness with the distinctly inflammatory diseases of the heart. The sequence of events that follows the vascular degenerative changes of the heart as a direct result of undernutrition of the myocardium, with a subsequently developing circulatory failure, must be sharply differentiated from those types of heart failure in which acute or subacute inflammatory processes of the heart are responsible.

To both these concepts of heart failure, the term *myocarditis*, either acute or chronic, has been applied with blissful complacency. From a purely postmortem angle, however, many such conditions have been discovered to be the result of coronary arterial changes with their associated myocardial mischief such as infarction with its attendant necrosis and fibrotic repair. Myosclerosis, myodegeneration, myofibrosis, lipoid and hyaline degeneration of the various structures of the heart are but a few of the well-recognized and older attempts at a closer correlation between clinical and purely postmortem table findings. The diagnosis of these solely pathologic changes is impossible, however, in most instances, at the bedside and at best may be considered in the light of scientific guesswork.

What is of far greater interest to both clinician and pathologist is the fact that many individuals who present undisputed symptoms of myocardial impairment in life may exhibit hearts which are apparently normal even after the most searching scrutiny on the autopsy table and sectional investigation. This perplexing and by no means infrequent paradox is seen not only in those patients who suddenly drop dead from angina pectoris but also in those individuals who give a long history of cardiovascular dysfunction. There can be no question, therefore, but that a purely physiologic condi-

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tion arises in the heart which has no pathologic counterpart, in so far as our present methods of laboratory investigation are concerned. For this reason the attempt to hitch a purely pathologic diagnosis to such conditions is no more sound than the previous attempt of pasting a *chronic myocarditis* label upon all such cases.

It is here that our term "myocardosis" strives to bridge the gap between the pathologic shortcomings and clinical manifestations of circulatory disease. Many investigators have attempted to crystallize this conception by other terminology; Christian, for example, speaks of non-valvular heart disease and Winterberg of "plötzliche Herzschwache". It is to Riesman, however, that credit is due in stressing the peculiar adaptability of "myocardosis" in explaining the failing heart of middle life. Wolffe of Philadelphia employs our conception of myocardosis in its fullest physiologic significance in that he regards coronary insufficiency in its earliest stages as a definite manifestation of this condition.

In its frank form, coronary insufficiency, with thrombosis, occlusion, and myocardial infarction needs little comment in a paper such as this; the diagnosis of these advanced stages of the myocardosis syndrome is not at all difficult. The assistance rendered by the electrocardiograph, x-ray, vital capacity and blood pressure readings has eliminated many former pitfalls of judgment. It is on the earlier manifestations of the myocardosis syndrome that we must now focus our attention, recognizing full well that treatment of advanced coronary disease is, in most instances, futile.

In a series of 1,000 patients in whom a diagnosis of advanced coronary arterial disease had been made, the late Prof. Kaufmann of the Heart Station of Vienna discovered that three cardinal symptoms stood out, leading all others in frequency. These three symptoms were not only the most common but they were also the earliest to appear in a patient's history. Not infrequently these symptoms could be traced back for many years depending in many cases upon the care used by the questioner in eliciting all of the facts. These three symptoms, known as the three steps to heart failure, are dyspnea, palpitation, and substernal discomfort.

Sir James Mackenzie, shortly before his untimely death, was engaged in the problem of correlating the earlier symptoms of heart disease with the advanced pathology seen in the terminal stages of circulatory failure; he was especially interested in the earliest symptoms developed in mitral stenosis and for many years he kept a careful record of all the symptoms described by such patients. It was his firm belief that the discovery of such signs, vague though they may be, might do much to forestall and delay the eventual cardiovascular breakdown.

It is our belief that symptoms of coronary insufficiency may be detected many years before the actual and more or less frank onset of circulatory disturbances in the heart. In this connection Kaufmann's triad of dyspnea, palpitation, and substernal distress may well engage our attention in every individual approaching middle life, more especially when the patient himself volunteers the information that one or another or any combination of these three symptoms are giving him some concern. Physical examination of such a patient, however, is in most instances highly disappointing and the word "negative" is an expression frequently applied to even a searching cardiovascular survey, which would include laboratory, electrocardiographic, and x-ray procedures. These are the patients which are turned out of the doctor's office with the reassuring advice that nothing is the matter with them and that minor changes in diet, more rest, and other such platitudes will probably "fix them up all right". This same patient, however, may subsequently prove to be a matter of some concern, not only to the doctor but to the patient's family when, contrary to expectations, he suffers a complete and now an unmistakable cardiovascular breakdown. Indeed, with utter disregard of the examiner's prognosis, such patients have been known to drop dead on their way home from the doctor's office, becoming a problem of awkward and rather difficult explanation.

What has really happened to such a patient? What is the true underlying pathology? What standards of measurement shall we use as a future guide to prevent such accidents and eliminate some of the prognostic pitfalls? These are matters of great concern and the future must find better methods of diagnostic analysis and to us, as indeed to all other professional classes, this question is entirely too dangerously close for comfort. The deadly selectivity of such cardiovascular disturbances among these groups of organized society is, sad to say, well established. On the other hand, the lot of the common laborer guarantees no immunity from the dreadful consequences of coronary thrombosis and its allies, but all statistical tables show the decided preponderance of professional mortality.

Therefore, with no material assistance rendered either by our present methods of examination or from the postmortem room, the question resolves itself in the proper analysis and evaluation of the earliest manifestations of cardiovascular damage. Probably in no other field of medicine could the concept of Mackenzie be better applied; his theory of vague symptomatology may well be utilized in the examination of Kaufmann's triad. Through such channels, a careful scrutiny of the various manifestations of the three cardinal symptoms of dyspnea, palpitation and substernal distress may be fruitful of much valuable information. Let us now consider each of these in turn in order to determine what

clues, if any, may be gleaned from such procedure.

DYSPNEA

The onset of *dyspnea* after effort is always a vague and often difficult symptom to interpret. Just when the breathlessness which comes after various degress of exertion ceases to become a normal physiologic response and begins to be a pathologic manifestation may be a point of nice distinction. The problem is further complicated by the natural reticence and the unconscious resistance of the individual to acknowledge constitutional depreciation. This is especially true in men who have led vigorous athletic lives, in whom the signs of physical letdown are almost synonymous with the psychologic inferiority complex so aptly described by the sporting phrase "has-been". Pride of physique and sexual prowess are reluctantly abandoned by every man and confession of their deterioration is made with great sacrifice to personal ego.

Many individuals, upon being questioned in regard to breathlessness, will evade a true explanation of its occurrence by suggesting that it is a natural phenomenon and hence of no especial significance. When the question is asked about the reaction experienced upon stair climbing, the answer often given is that one must expect to get out of breath after such effort. Women are more prone to acknowledge the onset of dyspnea than men of equal age; indeed, they often volunteer such information even before interrogation. This difference between the two sexes is also manifest in regard to most symptoms referable to a failing cardiovascular system; women, in general, tend to emphasize symptoms to the point of unconscious exaggeration whereas men tend to underestimate them.

Many studies have been made in regard to the functional response of the heart and blood-vessel system to effort. Thousands of normal individuals have been subjected to various types of standardized ergometric tests, from which pulse rate and blood pressure response are noted as well as evidences of dyspnea. The information gleaned from these tests has established certain criteria which are now well recognized throughout the professional world. Regardless of the method used, it should be noted that the difference between the normal response of individuals at different age periods of life becomes greater as the age period increases. For example, in children and young adults the line between the normal and the abnormal can be more clearly drawn than in the middle and advanced ages; factors not considered in the young are of the greatest importance in this latter group. The overweight factor, habits, occupation—all play a part in rendering an individual estimation more difficult; whereas two children of equal age should give similar effort response to a single test, two individuals of the same middle age group may vary considerably in their reactions without either one being considered deficient.

The evaluation of the dyspneic factor can be determined rather accurately by proper questioning. The patient should be asked whether he has noticed that it is more difficult to climb a certain flight of stairs now than formerly. Due regard must be given to the individual psychology, as described before; frequently it may be necessary for the physician to take the patient into his confidence and explain to him that admission of this lessened ability is no disgrace, while evasiveness and failure to admit such handicap may be far-reaching in paving the way for further damage.

We have believed that of far greater importance than standardized effort estimations were those tests which were peculiarly adaptable to a patient as an individual rather than as a member of a group. Such tests are readily obtained by comparing a patient's response to his ordinary daily occupational effort. Where the climbing of stairs, for example, is causing breathlessness in an individual who had not experienced such symptoms on the same stairs but a short time ago, much valuable information is given to the examiner. In a similar way, other habitual types of effort can be analyzed; thus, the walking up a hill, the carrying of loads, the performance of certain specific daily occupational duties, can each be evaluated by close scrutiny of the response now compared to that obtained formerly. It should be clearly pointed out at this time that no standardized effort test can ever be as valuable as that concerned with the individual's daily routine. No test can ever be devised which will equally and impartially evaluate the effort response of a clerk and a laborer; to gauge the functional distress of a bookkeeper and a blacksmith by the same yardstick is obviously fallacious.

In general, breathlessness is to be considered as one of the important features of myocardosis; in its early manifestations it may masquerade in atypical forms, to be disclosed only in so far as the skill of the examiner permits. In its frank form it should be stressed as indisputable evidence of cardiac impairment unless other well-defined causes are revealed. Even then, the coëxistence of two or more conditions must be borne in mind as a possibility.

PALPITATION

The second of the great triad making up the early diagnosis of myocardosis is that of palpitation. From time immemorial this has been associated with heart disease under various guises, terms, and phrases. An extensive review of palpitation as a symptom has been studied for the past five years by the Witkin Foundation under the title of "Heart Consciousness" and data from more than 5,000 cases have been correlated. Heart consciousness is only a subjective phe-

nomenon; it is experienced by the patient; the examiner is dependent upon the descriptive ability, the intellectual capacity and emotional reactions of the complainant. Little wonder, therefore, that the significance of this very common symptom is not well understood and is either overestimated or underestimated as to its true significance.

Heart consciousness is usually described as varying from a mere awareness of the heart's activity to a painful pounding in the precordium. Thumping, skipping, fluttering, knocking, shivering, and numerous other designations are given to this sensation. A whole gamut of feelings, ranging through all degrees of pain and discomfort, are expressed. The condition apparently occurs with equal frequency in all age periods from youth to old age. It is strange that so common a symptom should not have received the scientific study it deserves. The unpublished reports of the Witkin Foundation show that 64 per cent. of the patients complaining of this symptom have some abnormality of the cardiovascular system; these abnormalities vary from extrasystoles to the most serious types of heart disease like auricular fibrillation, flutter, and heart block. The remaining 36 per cent. complaining of heart consciousness, but in whom no cardiovascular disease can be demonstrated, appear mostly in the younger age groups. It is significant as well as interesting, therefore, to note that, so far as the middle age period is concerned, almost 81 per cent. of the individuals complaining of palpitation has associated myocardial or vascular changes.

We need enter here, therefore, only into a consideration of palpitation as seen in middle life. From the figures given above it is, apparently, a symptom not to be regarded lightly, in contradistinction to heart consciousness appearing in the young. Very often we are prone to underestimate the complaints described under heart consciousness and, within the past few months, we have had various symposiums upon the subject of the cardiac neuroses, in which the general feeling seems to have been that heart consciousness is a symptom of minor importance. In our experience, when a patient who has previously suffered no such sensations suddenly complains of palpitation, regardless of the phraseology used by him to describe it, nothing less than a complete cardiac survey should appease our professional conscience.

In a study of palpitation made upon middle-aged individuals we have found that some interruption in the normal cardiac cycle has been responsible for the production of this symptom in about 75 per cent. of the cases; in this group the extrasystolic arrhythmias predominate and the cause of the palpitation is readily demonstrable. It is to the remaining 25 per cent., in whom no cardiovascular alterations can be determined clinically, that our attention must be directed; these cases require further study.

Without going into too great detail in regard to the mechanism involved in the production of palpitation and heart consciousness, it has been shown that many factors, extracardiac in origin, may be responsible for this complaint. Not the least of these are the factors of emotion or temperamental make-up of the patient. Gastro-intestinal disorders, pathology in the chest and mediastinum, liver and gall bladder disease and endocrin dysfunctions, more especially those of the thyroid, must receive their proper evaluation.

In the early stages of myocardosis, however, the sudden onset of palpitation after effort of the habitual or customary type should be regarded as a specially significant symptom even though it may appear in individuals who present no other cardiovascular signs. It must be sharply distinguished from the heart consciousness of emotional origin and from misinterpretation of gastro-intestinal sensations. Occurring in active and vigorous individuals of the middle-age group, it cannot be lightly treated as it forms, either alone or in conjunction with the other two great symptoms of dyspnea and substernal oppression, one of the unmistakable milestones in the onset and progress of the degenerative changes developing in the cardiovascular system.

SUBSTERNAL DISTRESS

Of the three important symptoms of early myocardosis, probably the one most clearly crystallized in the minds of both the lay and medical public is that of substernal distress. The difficulties experienced in describing the varied types of sensations grouped or assembled under the phrase "heart consciousness" is, perhaps, no greater than that defining the symptom complex roughly designated as *substernal distress*. In the first place, the word, *distress*, hardly carries with it the subjective sensations experienced by the patient who attempts to convey the exact impressions to the examiner. Apparently these sensations extend all the way from a mere heaviness over the upper part of the chest to that of the terrific vice-like constriction experienced in certain forms of angina pectoris.

In the early stages of myocardosis the sensation is not particularly painful when compared to other kinds of pain; it is rather a sensation more akin to the feeling of compression or tightness. The actual pain element, when it occurs, appears to be more associated with peripheral radiations than in the area originally and specifically called to the attention of the patient. Once again, as in the case of dyspnea, the patient's description of the symptoms will depend upon his intellectual acuity and his ability to express himself.

The peculiar localization of this symptom is of especial interest in that patients invariably point to the midsternal area rather than to the

precordium. Often no reference to the heart is made by individuals who complain of this symptom, as the area called to their attention may not be associated in their minds with heart disease. In a comparative study of 100 cases of myocardosis in which the chief symptom has been substernal distress, it was found that about 60 per cent. localized their discomfort to an area at the upper end of the sternum; 20 per cent. described the area as being more to the left than to the right of the upper part of the sternum. In 8 per cent. the entire sternum was the seat of the discomfort. In the remaining cases there were many bizarre localizations, which included both clavicular areas, both upper chests, the lower end of the sternum, and the subscapular areas. In the early types of myocardosis, radiation of the pain factor is apparently not so great as it becomes later on when there is marked vascular and myocardial degenerative change.

From a diagnostic standpoint, substernal pain or distress can usually be differentiated without difficulty; it is invariably associated with effort, usually of the muscular type. We have never seen this symptom develop from pure mental strain or gastro-intestinal irritability; in this it stands in direct contrast with the very severe forms of myocardosis approaching the so-called "status anginosus" with coronary thrombosis. Of the three major symptoms of beginning myocardosis, substernal distress on effort is unquestionably the one which causes the patient to seek medical attention before the others. Whereas dyspnea and palpitation may be considered by an individual to be his normal response to physical exertion, substernal pain immediately causes no little degree of alarm. We have pointed out before the peculiar psychologic complex which we have described by the word "ergophobia", or the peculiar anticipatory fear of exertion; in a somewhat similar manner the substernal distress of early myocardosis carries with it more than a mere pain factor or sense of discomfort. There is also a vague, though nevertheless easily recognizable, element of apprehensiveness; this may not be even clearly defined to the patient himself except in so far as he may point out that it is a different kind of a pain.

SUMMARY

This hasty survey attempts merely to outline the early symptoms of myocardosis. We have sought to trace this condition through the remote general symptoms which develop more or less insidiously in most individuals approaching middle life. Practically all of the symptoms have been subjective in character and have been obtained in true relief only by the skill and care displayed by the examiner in eliciting the many subtle changes which occur when the cardiovascular system begins to show signs of losing its former functional integrity. We have previously pointed out how painstaking such a history must be and how elusive and how easily overlooked some of these symptoms may be. A review of these symptoms under a discussion of easy fatigability, insomnia, personality changes, anorexia, gastro-intestinal disturbances and decline of the individual's ambition all indicate the intangibility of the subjective phenomena occurring in early myocardosis.

We have considered the great triad of symptoms referable to the cardiovascular system itself and the part that dyspnea, substernal discomfort, and palpitation played in completing a presumptive diagnosis established by purely subjective symptomatology. We have made no mention of the positive findings in the physical examination of such individuals; when the electrocardiograph, x-ray, or other laboratory procedures yield evidence of cardiovascular damage, such cases can no longer be considered as coming within the definition of early myocardosis.

We have attempted, in short, to develop the syndrome of early myocardosis as one in which the ordinary methods of examination are generally negative or inconclusive and yet, at the same time, we have the opinion that something is wrong with the patient. Into this group come thousands of individuals who pass life insurance examinations without difficulty and who are turned out of many a consulting room with a negative notation on his record, but who, sad to say, subsequently develop severe and unmistakable heart disease.

In conclusion, we shall find no fault in the criticism of our term *myocardosis*, neither shall we quarrel with any one challenging our conception and interpretation of the early manifestations of this form of heart disease. If this paper will do nothing more than to again direct attention to early signs of cardiovascular breakdown as it is seen by all of us among our middle-aged patients, it will have more than served its purpose.

REFERENCES

1 Hyman, A. S., and Parsonnet, A. E.: Myocardosis. J. A. M. A. 94:1645, May 24, 1930.
2 Sigler, L. H.: Myocardosis. J. A. M. A. 94:2015, June 21, 1930.
3 Wolffe, J. B.: Myocardosis. J. A. M. A. 95:361, Aug. 2, 1930.
4 Elmer and Rose: Clinical Diagnosis. 6th ed., 1930, p. 787.
5 Kong. Zentralbl. f. d. ges. inn. Med. Berlin, 58:456, Sept. 29, 1930.

GLAUCOMA*

BY WILLIAM D. ROWLAND, M.D.†

GLAUCOMA, derived from a Greek word meaning *a sea-green*, is defined by Gould as "a disease of the eye characterized by heightened intraocular tension, resulting in hardness of the globe, excavation of the papilla or optic disc, a restriction of the field of vision, corneal anesthesia, colored halo about lights, and lessening of visual power that may proceed to blindness. The etiology is obscure."

ANATOMY AND PHYSIOLOGY

The eyeball, containing nothing in its make-up in the way of a framework to insure its form and shape, depends upon inflation controlled by an almost spherical outer coat, the tough sclera completed in front by the tough but transparent cornea. Inside this resisting outer coat are inlaid the pigmentary structures, all rich in vascular supply, namely: the iris, ciliary body, and choroid. Lying upon this coat is the delicate neuroepithelium of the retina with fibers arising therefrom, which, in turn, go to make up the optic nerve. The posterior seven-eighths of the globe is filled with the vitreous body, which is a gelatinous substance. At the anterior limits of the vitreous body the crystalline lens is held in position by a delicate membrane attached peripherally to the ciliary body. The pupillary border of the iris rests upon the anterior surface of the lens and aqueous humor fills in the space both in front and back of the iris, bathing the anterior surface of the lens. In order for the eye to be a perfect optical instrument the transparent and refractive surfaces and media must be kept clear and open to light by a very interesting and finely adjusted balance of intraocular pressure, above which, or below which, the organ fails to function properly. The arterial supply to the globe comes mostly from the ophthalmic artery, which divides, its larger branch entering through the sclera and dividing into a very profuse network throughout the pigment coat of the eye. A smaller branch enters the optic nerve about 15 mm. back of the globe and supplies the retina without anastomosis. The fluids which inflate the globe are derived probably as dialysates from blood vessels and, perhaps, from some secretion within the eyeball in the posterior or vitreous chamber. These fluids pass forward around the lens into the aqueous chambers where, after passing through the pupil, they escape from the eyeball at the periphery of the cornea, in front of the root of the iris, being taken up by filtration through lymph spaces and eventually by veins.

*Written for the general physician.
Presented before the Alethean Club, Boston, January 2, 1931.

†Rowland — Professor of Ophthalmology, Boston University Medical School. For record and address of author see "This Week's Issue", page 682.

ETIOLOGY

Any mechanical interference with the freedom of intraocular fluid drainage from the vitreous body through the pupil, until it is within the reach of the external venous circulation, can upset the intraocular tension. Such conditions as occlusion of a pupil by adhesions after iritis, a sudden swelling of the lens by trauma, adhesions of the iris at its root to the cornea covering up the entrance to the drainage spaces, will result in an increased intraocular pressure. On the other hand, many cases of glaucoma develop without these mechanical causes. Oftentimes unusual mental or physical stress, such as business worries, severe accidents, or dissipations seem to result in vascular congestion within the globe, due to a disturbance of the sympathetic, and precipitate glaucoma. It is a disease of advanced life, being one of the major causes of blindness after forty-five. Seldom are both eyes involved at one time, but usually the second eye becomes implicated sooner or later, particularly in the primary type. Jews are more vulnerable to the condition, probably due to characteristic temperament.

CLASSIFICATION

There are two main divisions, depending largely upon the rapidity of the intraocular tension rise. If the rise is rapid, the eye is red and painful, with a rapid loss of vision, the pupil wide, the cornea steamy and anesthetic from water-logging due to pressure, and oftentimes there is a severe temporal headache associated with nausea and vomiting, simulating a gall bladder attack. This condition usually drives the patient immediately to a physician, very frequently during the night, when the tension is more likely to be higher than in the active daytime. Mistakes have been made in diagnosis because the eye has not been taken into consideration and the patient has been thought to be suffering from an acute abdominal disorder. The correct diagnosis is found to be *acute inflammatory glaucoma.* If the increase of tension is slow, the patient complains of nothing except, perhaps, halos about lights, a desire to have his glasses changed rather frequently, and a very slow loss of vision so that, as a rule, the patient does not seek help until the visual loss is far on the way to blindness. Under these conditions the eye will show a wide pupil and a shallow space between the lens and iris and the cornea in front. The ophthalmoscope shows a pushed-back optic nerve head, called a cupped disc, which is due to long continued pressure. The cornea is anesthetic. The visual field shows marked cutting, particularly on the nasal side.

This is the *non-inflammatory type or simple glaucoma*, acting like a thief in the night and often undiscovered until a great loss of vision has already occurred, not to be recovered.

The two varieties described above are the subdivisions of primary glaucoma. Secondary glaucoma may be divided into the more acute or more chronic types, depending upon the nature of the condition producing the secondary increase of tension. As mentioned before, iris adhesions in iritis, injured lenses, intraocular tumors, disturbances due to detached retina, etc., are usually found in secondary glaucoma*.

DIAGNOSIS

The diagnosis is made upon one finding, namely, increased intraocular pressure, determined by palpation of the eye by trained fingers, or more accurately determined by a tonometer—an instrument similar to the average blood pressure apparatus, which measures the intraocular pressure in millimeters of mercury. Which type of glaucoma exists depends upon the symptoms previously delineated. We always, therefore, speak of two kinds of glaucoma,—the acute inflammatory type, which is always painful, in which there is sudden loss of vision, and for which the patient seeks medical aid immediately; and the non-inflammatory type, where there is no pain, the eye is white, and a slow and irrecoverable loss of vision ensues.

TREATMENT

The treatment consists of medical and surgical procedures. In the large majority of cases medical measures are first to be tried and if the intraocular tension is not quickly brought down, then an operative procedure is necessary in order to stop further loss of vision by pressure upon the delicate retina and optic nerve. The medical treatment consists of the use of miotics—pilocarpine 1% or eserine ½%—instilled from once every two hours to two or three times a day, according to the severity of the case. This produces its favorable result by pulling the iris straight across thereby opening the drainage angle at the base. Morphine is particularly well suited to the acute, painful type because it produces a small pupil and helps to get the patient quiet. Local application of heat to the eye, the patient being kept quiet with the head raised and away from all sources of irritation, usually aids in vascular outflow. Good elimination from the intestinal tract is advisable. If the acute attack is not put under control within twenty-four or forty-eight hours, an operation is indicated. The usual operation is a wide iridectomy, which probably has its effect by opening up the drainage spaces at the root of the iris.

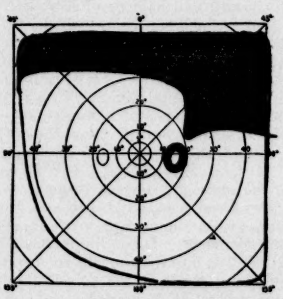
Non-inflammatory glaucoma requires none of the emergent measures except that of miotics and it is not considered safe to continue with these unless the tension is quite promptly brought to normal and further loss of vision stopped. Therefore, operations are more frequently done in this type. The operation is a type of decompression in the form of a trephine or a wick drainage obtained by pulling the iris through an opening under the conjunctiva. The progress of the case is determined upon carefully watching three factors in the case: the visual field, intraocular tension, and visual acuity,—named in the order of their importance. One might be wholly misled in feeling that the patient was doing well if his condition was judged upon the facts of visual acuity and pressure. With both of these factors quite good and the visual fields showing further loss, the progress of the case is going in the wrong direction. It is only in the last stages, just before blindness, that central vision—the part which the patient uses for reading and other exact seeing—is affected. Therefore, great losses can occur before vision leads one to the danger point.

PROGNOSIS

The prognosis is usually good in both types, but the patient requires very careful and expert care, oftentimes taxing the ingenuity and judgment of one of large experience and good training in ophthalmology. Neglected cases, either because of poor treatment or late treatment, or an occasional very virulent acute fulminating type, usually result in blindness and, sometimes, intraocular disorganization and a shrunken globe.

The following case report is rather typical of the acute inflammatory type:

Mr. S., age 42, a Jewish junk dealer, had been under care for nine days with pain in the right eye, having had slight attacks of discomfort for five months. The eye showed a marked ciliary injection,

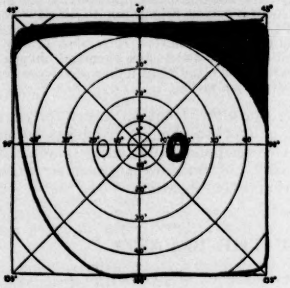


No. 1, Mr. S, right.

the cornea was slightly hazy and anaesthetic, there was a shallow anterior chamber and a wide pupil; the disc was not cupped; vision 20/200, tension 60 mm. (normal 25 mm.), visual field cut in upper right quadrant. The left eye was normal with normal vision. This patient had been under treatment by a referring oculist and had been using pilocarpine 1%

*Buphthalmos is a rare type of glaucoma occurring in early childhood. As a rule the eyeball grows to be very large and thin because of pressure.

each three hours. This was increased to 2%, to be used every two hours. With the routine for improving elimination and the use of necessary sedatives the patient was not made comfortable and the tension



No. 2, Mr. S, right.

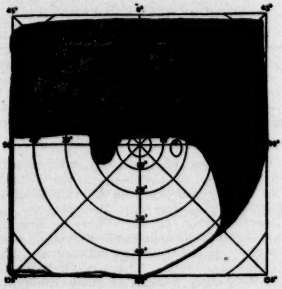
not under sufficient control. Three days later an iridectomy was performed, the usual procedure in acute cases. An observation three months later showed almost normal vision recovered, the eye quiet, with normal tension and a normal field.

This illustrates that early and efficient care in acute cases with a marked sudden loss of vision may obtain almost total recovery.

(Charts 1 and 2 illustrate the field before and after operation.)

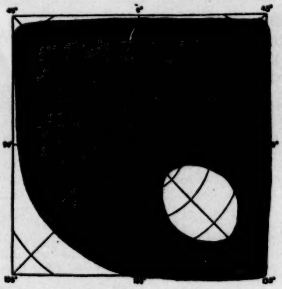
The next case illustrates a neglected case of non-inflammatory or simple glaucoma.

Mrs. L., aged 58, saleswoman, referred by an oculist for an opinion concerning the status of the right eye, which is practically blind. She has been aware



No. 3, Mrs. L, left.

of poor vision in this eye for six months or longer. The eye was white, the anterior chamber reduced in depth, the cornea clear but reduced in sensation. The ophthalmoscope showed a markedly cupped and white disc, indicating atrophy. The tension was ten to fifteen points above normal. The visual field in this eye was almost lost. The left eye showed signs of simple glaucoma with central vision still preserved, tension ten points above normal, and visual field markedly cut. This case has been controlled over a



No. 3, Mrs. L, right.

period of four years by the use of miotics, pilocarpine 2% daily in each eye.

(Chart 3 shows the first observation.)

COMMENT

Glaucoma, then, is a peculiar ocular disease, diagnosed upon one finding, increased intraocular pressure, but having a variety of other symptoms which enter into the picture. As before stated, it is a major cause of blindness after 45, many more patients being disabled by this than by cataract. Within one year the Massachusetts Eye and Ear Infirmary has seen over 700 patients with glaucoma. The patient with an acute case will always seek help and might be mistaken to be suffering acute abdominal pathology unless the eye is investigated. The patient with the non-inflammatory type of the disease oftentimes has had the glasses changed several times by a non-medical refractionist—in these days the optometrist—who, not being trained in the interpretation of pathology, continues changing glasses, whereas a medically trained man could detect the presence of glaucoma and, thereby, institute necessary treatment. There are, therefore, many neglected cases of this type of glaucoma. While the ophthalmologist expects the general medical man to detect some cases of glaucoma, it is beyond expectation to have them all filtered out, but great care needs to be exercised in the interpretation of the patient's complaint and the education of the public to the greater service that a medical refractionist can give. A rule to follow, therefore, is the careful investigation of *every loss of vision*, particularly the sudden losses. A great variety of important conditions might be thus uncovered, affecting all structures of the eye, from the cornea to the optic nerve or its intracranial connections, among which might be mentioned, of the more important causes besides glaucoma, detached retina, intraocular tumors, retinal haemorrhages, destructive lesions in the maculae from vascular or toxic sources, inflammation of the optic nerve, choked disc caused by increased intracranial pressure, and lesions along the optic pathway from the

eye to the visual centers in the calcarine fissure in the posterior occipital lobe. Occasionally, one of the metabolic diseases is encountered as will be illustrated by the following case:

A young married woman was referred by the family physician because of marked inability to read and do other fine work. She had distance vision of 20/30, brought to normal by a moderate correction of hyperopia and astigmatism. Her near vision was very faulty, about Jaeger 10, but brought to normal by the addition of a glass ordinarily needed by a patient fifty years of age. The interesting feature in this case was the presence of diabetes. The patient had been in diabetic coma ten days before and was literally snatched back to life by prompt care on the part of her physician. One year before she had gone to an optometrist because of poor distance vision and he gave a correction for myopia. There is probably no doubt whatever that this visual change was a symptom of diabetes and had she consulted a medical man instead of an optometrist, he probably would have detected something to set her going on the care of her diabetes at that time. The cause of the marked change in the refractive media of the eye in diabetes is due to the chemical change of the intraocular fluids and their effect upon the lens and other refractive media.

To recapitulate, frequent desire for change of glasses or marked changes in vision should lead one to be suspicious immediately of glaucoma or, possibly of diabetes, intraocular disease or intracranial complications.

A CASE OF TERATOMA OF THE BREAST*

BY WM. PEARCE COUES, M.D.†

EWING[1] tells us that "the term 'teratoma' has a restricted application to a group of tumors composed of recognized tissues and complex organs, derived from more than one germ layer".

Though isolated reports of teratoma of the breast may have occurred in surgical literature, I have been unable to find such a case. Questioning a number of surgeons of large experience in the surgery of the breast, has given negative results.

Ewing[1] describes certain "mixed teratoid tumors of the breast," but a true teratoma of the breast is not listed in his index. As to the origin of these teratoid tumors, he writes as follows: "The origin of the teratoid tumors of the breast has been attributed to complex embryonal inclusions, containing mesodermal skeletogenous material and fetal ectoderm. On the other hand, it has been clearly shown that this series of tumors includes many transition stages from fibroadenoma up to the most complex forms. Close histological study appears to show every stage of metaplasia from the ordinary gland and stroma cells of the breast into cartilage, bone and squamous epithelium. In the dog tumors, this histological evidence is unequivocal. Hence it appears necessary to accept the theory of autochthonous or local development of mammary mixed tumors."

Speaking specifically of teratomas, he says, "Thus, three main groups may be recognized of tumors containing adult or embryonal organs in disorderly arrangement." The first class, he says, "are derived from aberrant sex cells, and are found chiefly in the sex glands. The next class are the extragenital teratomas, many of which approach the development of the parasitic fetus, and which may be derived from isolated, nearly totipotent blastomeres, or from early budding of the blastoderm. The last class, teratomas (or teratoids) are derived from multipotent material of distinct regional stamp, and reproducing the organs of these regions. These tumors are usually associated with a defect in the formation of the parts from which they spring."

The differentiation of teratomas and teratoids, he states to be as follows: "While in the parasitic fetus the organs are arranged in normal, or nearly normal relations, producing a rudimentary fetus, in the teratoma there is a noticeable lack of orderly arrangement, producing merely a veritable *potpourri* of fetal tissues. The less complex tumors of this class may be designated as teratoids."

The above definitions and descriptions of Ewing give us an idea of the teratology of the breast, in connection with this rare tumor. Outside of current surgical literature, noted above, efforts were made to find mention of teratoma of the breast in the older surgical works, without result.

I am indebted to Dr. Beth Vincent, Surgeon to the Massachusetts General Hospital, for the privilege of reporting the case cited below.

G. E. H., a widow, 60 years old, was admitted to the surgical service of the hospital on February 6, 1923. The family history was as follows: Father living, 85 years old; has had two shocks. Mother died of heart trouble, at 68. There is one brother living and well. The patient's husband has been dead 28 years; cause of death unknown. There is one son living and well. There have been no miscarriages. No family history of tuberculosis, cancer, or diabetes.

Past History

The general health of the patient has always been good. There was a history of an uncomplicated pneumonia, and scarlet fever in childhood. There were no previous operations. There has been no cough; she has had occasional slight dyspnoea on climbing stairs. There has been occasional edema of legs, probably due to varicose veins. There have been occasional attacks of indigestion, with some gas, but no history of any nausea or vomiting. The menopause was at 45; there has been no flowing

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since. Urination, about five times a day, once at night; there was nocturia on one occasion.

Present Illness

The patient noticed a lump the size of a walnut, in the right breast, three months ago. A physician, after examination, advised operation, but the patient preferred treatment of her own with salves. Since then the mass has grown to the size of an orange, and she had a constant aching pain just above the tumor. Her weight remained at 240 lbs.

Physical Examination showed a well-developed, obese woman. There was definite dullness at the base of both lungs, where there were both moist râles and dry crackles present. There was dullness over the left front, with prolonged expiration. The heart sounds were regular and slow. Percussion unsatisfactory, on account of obesity.

The abdomen was soft; there were no masses, tenderness or spasm noted. The reflexes were normal.

Local examination of the right breast. In the right breast was a large, hard, slightly irregular movable tumor, the size of a baseball. No masses could be felt in the axilla.

Preoperative diagnosis, carcinoma of breast.

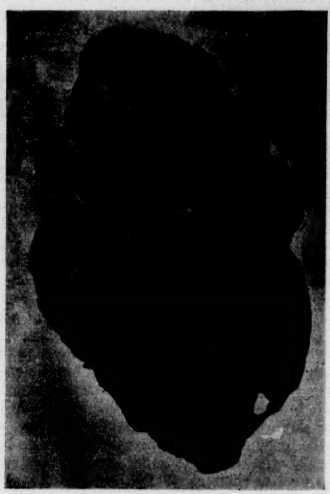
Postoperative diagnosis, teratoma of breast.

Operation

On account of the patient's condition the breast was removed under local anesthesia, the pectoral muscles removed and the axilla dissected. Some sloughing developed in the axillary portion of the wound, and there was fever. About three weeks after the operation, there was a violent secondary hemorrhage, and death followed, on the same day. There was no autopsy.

Pathological Report

"An entire breast, with the axillary contents attached. On section it contained a hard, spherical tumor, i.e., the outer hemisphere, 8.5 cm. in diameter, which has a fibrous, greyish white surface, and is surrounded by fat of the breast, a large portion of which is of bony hardness. In one area an alveolar process, with teeth, can be made out. The surrounding breast itself is fibrous, with cysts. There are a few soft lymph nodes in the axillary contents. Microscopic examination shows a nondescript connective tissue, which in places is cell rich, and shows numerous mitotic figures. There are trabeculae of osteoid tissue scattered through it, and an occasional area of cartilage. There is no evidence that the tumor is malignant. The axillary lymph nodes are normal. Teratoma."



Teratoma of Right Breast. Note bone formation, an alveolus with teeth imbedded in the breast tissue.

SUMMARY

A brief description of teratology of the breast is given, according to Ewing's classification. The history, clinical appearance, and pathological report of a teratoma of the breast are described, with a photograph of the tumor.

REFERENCE

1 Ewing, James: Neoplastic Diseases. W. B. Saunders Co., Philadelphia, 3rd ed., 1928.

DENTAL CARE FOR INFANTS AND SCHOOL CHILDREN

A popular notion that the first teeth are not worth dental treatment should be discarded, for it has become recognized that dental decay is one of the most prevalent of all diseases and physicians and dentists are generally agreed that the teeth of even young children should receive especial care regularly.

Nature cannot repair dental decay and the encroachment of disease on these structures should receive early attention.

Careful study of children, especially those of school age, has shown that a large proportion are suffering from diseased teeth and it is often found that bad behavior and indifferent application to school duties are due to the inhibiting influence of unsound teeth.

In order to save a tooth, parents should be told that here, as in many other abnormal conditions, only early attention will prevent extension to the deeper parts with the likelihood of abscess formation and systemic infection.

Any illness in childhood may affect the nutrition of a tooth and the absence of the essential mineral elements and vitamins may deprive the child of the necessary physical vigor upon which well-developed and sound teeth may depend.

The doctor sees the sick child but the dentist often is not called in until irremediable trouble has taken place.

Among the health functions of the family doctor instruction of parents with respect to the care of the teeth should be recognized. In this field he may practice pediatrics as well as the specialist and perhaps prevent rheumatism and heart disease which often follow infection in and about the mouth.

If the doctor omits the performance of his duty in this respect, if he is at all disturbed by sins of omission, he may have unpleasant recollections of some suffering child or an adult with a damaged heart.

THE HISTORY OF MEDICINE AT THE MOUTH OF THE MERRIMACK RIVER, NEWBURYPORT, IN RELATION TO THE ESSEX NORTH DISTRICT MEDICAL SOCIETY*

BY FRANK WHIPPLE SNOW, M.D.†

As the settlement of New England began at the coast and gradually spread inland, old Newbury is the oldest portion of the territory now included in the Essex North District.

Newbury was settled in 1635 by a group which came over from Ipswich and established a colony on the bank of the Parker River. In 1637, John Clarke settled in Newbury and was granted a farm of four hundred acres on the Parker River, and "in respect of his calling he was exempted from all public rates for the country or the town so long as he shall remain with us and practice his calling among us". Clarke removed to Ipswich in 1647 and soon after bought a home in Boston, where he died in 1664. There is no record, so far as I know, of Clarke's qualifications as a physician. Viets, in his *Brief History of Medicine in Massachusetts*, says that, with few exceptions, all the doctors of the colonial days were barber surgeons, and that much of the practice of medicine was carried on by the clergy, who received some medical instruction as a part of their clerical education.

Henry Greenland came to Newbury in 1663 and was entertained by John Emery, who was fined for harboring a stranger. Greenland remained in Newbury for three years and was considered a skilful physician, but was passionate, unprincipled, and quarrelsome. He moved to Portsmouth in 1666.

Peter Toppan, an ancestor of our R. L. Toppan, was brought to Newbury in 1637 as a child of three. He later practised medicine there until his death in 1707.

The early settlers were a hardy, self-reliant race of people. Medicine at its best was extremely crude, and every housewife had an assortment of herbs and simples that she doled out to her ailing family, who undoubtedly were better off than they would have been under the more violent treatment they would have received from the doctors of the time. Neighbors came in to lend a hand when a baby was born, and there were usually one or more women who were fairly skilful midwives. As the colony grew in size, importance and wealth, the standards of living improved and more and better-educated doctors took up their residence. Few practitioners were possessors of a college degree. Harvard Medical School was not founded until 1782, so it was necessary to go to one of the European universities. Medical education in this country was conducted under the preceptor system, which was not entirely abandoned until within comparatively few years. While this method of training would be of little value today, it worked remarkably well while it was in vogue, and produced many skilful physicians.

There seem to have been no events of particular interest from a medical point of view during the first hundred or more years of the town of Newbury; at least, none of the historians have much to say about the physicians of that period. Newburyport seems to have been extremely conservative on the subject of inoculation for smallpox, for our first hospital was not established until 1778, over fifty years after the practice was first adopted in Boston.

John Sprague and Micajah Sawyer were members of the Committee of Safety which was organized in September 1774, and Sprague and John B. Swett served with the Continental army.

During the War of 1812, John Brickett of Newburyport served as surgeon on board the "Decatur." It is interesting to know that his pay was fifty dollars a month. I have no information concerning the Mexican War, but my impression is that no Newburyport doctors took part in this campaign.

In the Civil War, Nathaniel Bradstreet was a surgeon on the "Merrimac," and John Park served on the Sloop of War, "Warren," which was built at Newburyport and sailed from there. There were no medical men in the regular army or the volunteer forces, but F. A. Howe, Charles C. Tolbert, and Ralph C. Huse, Jr., were contract surgeons. During the Spanish War, Newburyport made no contributions from a medical point of view.

In the World War, T. R. Healy served with the Navy. A. F. Thomas, A. J. Hewitt and I served with the Army. Dr. Healy and I have retained our service connections and both hold commissions in the Reserve Corps.

The American Academy of Arts and Sciences was incorporated in 1780; its charter resembles that of the Massachusetts Medical Society both in wording and arrangement. John B. Swett of Newburyport was one of the original members. This was the first scientific society incorporated in the State of Massachusetts and was the second in America. The Boston Medical Society was founded in 1780, but was organized primarily to establish fee tables. The Massachusetts Medical Society was founded by the enactment of a bill in the legislature November 1, 1781. John B. Swett was one of the original incorporators.

In 1796, Francis Vergines de Bouischere, a French refugee from Guadeloupe, arrived in

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Newburyport during the progress of an epidemic of yellow fever. He devoted himself to the care of the sick during the epidemic, and endeared himself to the community. He died in 1830 and left his library to the Massachusetts Medical Society.

There is no record, so far as I know, of any association of physicians in Newburyport until 1818, when the Newburyport Medical Association was formed for the purpose of drawing up a fee table and adopting a code of ethics which was similar to that adopted by the Boston Society a few years earlier.

In 1837, at the instigation of a group of Haverhill physicians, an association was formed under the name of the Essex North Medical Association. It was not until 1841 that the association decided to affiliate with the State Society and became the Essex North District Medical Society. There is no roster of members available prior to the year 1874, so it is impossible to discover how many men from the various towns in the district were members of the Society. There is a complete record of the officers, however, from the earliest meeting to the present day. The first President was Jonathan G. Johnson of Newburyport; Rufus Longley of Haverhill was Vice-President; F. V. Noyes of Newbury was Secretary; Isaac Boyd of West Newbury was Treasurer, and Jeremiah Spofford of Bradford was Librarian. Newburyport has been active in the affairs of the District Society ever since it supplied the first president in 1841. Other presidents have been:

H. C. Perkins	1849	J. F. Young	1895
Enoch Cross	1853-1863	J. J. Healy	1898
H. C. Perkins	1865	W. W. Pillsbury	1910-1912
F. A. Howe	1875	T. R. Healy	1917
C. P. Hurd	1886	F. W. Snow	1921
G. W. Snow	1890	R. C. Hurd	1925
		R. L. Toppan	1929

Enoch Cross was also a president of the Massachusetts Medical Society.

Rufus Wyman, who was president of the State Society in 1841, and who signed the charter of the Essex North District Society, was a practitioner in Newburyport.

The Society has had a remarkable record in the matter of secretaries. F. V. Noyes and J. G. Bromon served for one year each. Martin Root of Newbury was elected in July 1843, and served until 1874, thirty-one years. He was succeeded by G. W. Snow, of Newburyport, who served until 1887, thirteen years. Maurice D. Clarke of Haverhill was secretary for nineteen years, until 1906, when J. Forrest Burnham was elected and held office until 1930, twenty-four years. Four men held the office of secretary for eighty-seven years. We all hope that Dr. Bagnall will withhold his resignation until he has maintained the splendid record of service of his predecessors.

The earlier meetings of the society must have been rather dull and dreary affairs, from our point of view, and a bit pompous as well. The doctors of the early nineteenth century were more inclined to dignity and formality, and they seldom unbent, even when there were no laymen present. Their ethics may not have been any better than ours, but they certainly talked more about them and were inclined to bring charges against one another on grounds that would seem petty today; yet in going over the records of the early meetings, it is easy to read between the lines and see that human nature was much the same in 1840 or 1850 as it is in 1931.

The policy of the Society as defined at its first meeting was that an address be delivered by some member at each stated meeting, after which a general discussion should be held upon any epidemic, or other matter of professional interest, which may have occurred in this vicinity. At each meeting a fellow was elected to deliver the next address and another to serve as alternate. The orators were elected with great fidelity, but orations were conspicuous by their absence, not even excuses were offered as a rule.

Cults were springing up on all sides and threatening to ruin the business of the regular practitioners and corrupt their patients despite the fact that the medical profession had the same regard for the welfare of the public as it has today. Instead of osteopathy and chiropractic, the bugaboos in the early days of our Society were homeopathy and mesmerism, thomsonianism and the eclectic school. Many a bitter discussion occurred on these subjects and feeling ran high. Rufus Longley of Haverhill, who was the second president of the District Society in 1843, was charged in 1853 with consulting with and approving the course pursued by homeopathic physicians, and with having approved of Job T. Dickens of Newburyport and recommending him and his system of medicine. Dickens was an eclectic. At a later meeting, Longley's explanation of his conduct was accepted as satisfactory and the matter was dropped.

In 1860, the following resolution was passed: "Resolved that the Essex North District Medical Society considers the practice of meeting in consultation with physicians who practice homeopathy, hydrotherapy, eclecticism, thomsonianism, or any other species of quackery as reprehensible in any of its members." Other similar resolutions were passed on frequent occasions. There are as many if not more references in the records to cults and quackery than to any other subject. What a lot of time and energy and oratory was expended! Homeopathy rose and flourished, contributing much that was worth while to medicine, and finally its advocates merged with the regular profession; many of them are now valued members of our Society. The other systems of practice, having nothing of particular value, died a natural death. Could we perhaps learn something from the past?

In going over the records, I came across an incident which reminded me strongly of a similar situation that arose fifty-six years later. On

May 1, 1861, it was "Resolved that the members of this Society tender their professional services to the families of those who have been called into the active service of their country without charge." On May 7, 1862, the records say, "Whereas it has been supposed by some members of this Society that the resolve passed at the annual meeting in May 1861, in relation to the families of soldiers applied to all those now in service. Resolved that in the opinion of the Society that resolutions as passed in May 1861 referred only to the three months volunteers." In 1917, those of the medical profession who stayed at home offered to care for the patients of the doctors who were called into active service, and turn over half the proceeds. They did it with the same patriotic spirit that inspired the resolution of 1861, but they found it irksome and tired of their bargain just as their predecessors did.

In the two decades following the Civil War, the character of the meetings underwent a decided change; they became more liberal along scientific lines, more attention was paid to educational subjects, and less to the petty jealousies. The first outside speaker was Frederick I. Knight of Boston, a former resident of Newburyport, who demonstrated the power and uses of the laryngoscope. Unfortunately, I omitted to make a note of the date of this paper, but it was in the 70's. Later, speakers from Boston became more frequent and medical progress was reported from authoritative sources. Papers by members of the society were becoming valuable, too, and more pertinent. For instance, in 1874, E. P. Hurd of Newburyport read a paper on "The Germ Theory of Disease," that seems to have been very well received.

There was an even greater change in the meetings from a social point of view. Rather elaborate programs of entertainment were carried out in all parts of the district and for several years joint meetings were held with a group from Southern New Hampshire. Members of the societies took their families along and made considerable "whoopee" for those quiet days. In 1869, the Society was entertained by the Newburyport members, and men were taken out for a day's sail on the schooner "Comet", Captain Felch, master, and "were supplied with a rich and bountiful repast of necessaries and luxuries for the inner man".

In 1870, at Newburyport, the Society was provided with a steamboat and was carried up and down the river and out to sea, and in 1872, a "vessel" was supplied. On other occasions the members were entertained at private houses, and great preparations were made for their pleasure and comfort. I can well remember, as a small boy, the bustle, excitement, and interest that preceded the advent of the Essex North.

Times have changed and are still changing. Our Society has gone steadily onward, showing a healthy growth in membership and always standing for what was best in medicine. The character of our meetings has kept pace with changing conditions of life in general. I have the feeling, which may be all wrong, that our meetings do not mean as much to the members as they did a generation or two ago. In the 80's and early 90's, a meeting of the Essex North was a great event, not to be missed except for some great emergency, and a meeting in those days meant the loss of a whole day, with a railroad journey thrown in. I think the personal element was more of a factor. Strong friendships grew out of the occasional associations, and a spirit of mutual helpfulness was much in evidence. Today our gatherings are more perfunctory, our papers are better, yes; they are presented almost without exception by outside men who bring to us the benefit of their study and experience. We listen, we learn perhaps, but we do not discuss. We see many men, brother practitioners, whose problems are much the same as ours, but how much do we know of their lives, their work and their interests; as a matter of fact, how many of them can we call by name?

This is not said in a spirit of criticism, but merely by way of comment. It is a condition which exists and it is probably a sign of the times. We have more outside interests than our fathers did, and we have more and more accessible sources of professional information, and, what is perhaps more important, we haven't the same common ground. Fifty years ago, every member of this Society was a general practitioner, doing a little surgery, a lot of medicine, and considerable obstetrics; all in the day's work. Today many of us are devoting most, if not all, of our time to a more limited field of endeavor. Most important of all is the fact that we make little or no sacrifice for the sake of our Society. There is never a meeting that is more than forty-five minutes distant from the most remote member in his own automobile, and the telephone is always available to summon him in case of need. No one fully appreciates that which he obtains without some sacrifice. Perhaps that is the answer.

Our Society has always met its problems as they have arisen, and I feel sure that it will continue to develop and to represent the medical profession, not only at the mouth of the Merrimack River, but all along its banks.

HISTORY OF THE PRACTICE OF MEDICINE IN HAVERHILL AND VICINITY SINCE 1836—BASED ON THE RECOLLECTIONS OF FIFTY YEARS AND THE RECORDS OF ONE HUNDRED YEARS*

BY FRANCIS W. ANTHONY, M.D.†

APPROACHING with some hesitation the task assigned me by your president, I soon found myself deeply interested in looking over medical records that dated back to 1836 and continued until the present time, and I wish to acknowledge my indebtedness both to Dr. Bagnall, who brought out from the Medical Library a filing-box filled with records, and to Miss Pulsifer of the staff of the Haverhill Public Library, who has an almost uncanny instinct in finding references on subjects in which one may be interested.

The earliest record that I find of a medical society in the vicinity of Haverhill was that formed at the suggestion of George Cogswell, on June 29, 1836. The meetings were held about twice a year, at the homes of physicians who practiced within a radius of about twenty miles of Haverhill. In 1840 this association was considering petitioning the Massachusetts Medical Society for the formation of a branch in Northern Essex, and, in 1841, such a petition was forwarded and approved by the parent society. The first annual meeting was held in the hall of Merrimac Academy, Bradford, on May 2, 1842. On October 4 of that year, the address was on the subject of "Comparative Anatomy", which would hardly draw much of an audience today. In 1843 Dr. Clark of Andover spoke on the "Homeopathic System of Medical Practice." In 1844 Dr. Rufus Longley of Haverhill was president, and Dr. George Cogswell reported two cases, one of "aneurism" and one of "enlarged heart". In 1845 an unnamed person, whose courage was even greater than mine, read a paper upon the "Progress of Medical Science from its Earliest History to the Present Time." In this year Dr. Longley read a paper on "Puerperal Inflammation." In 1849 the subject of an address was "Anhaemia of Chlorosis." In 1852 we find the suggestion of a trend of thought toward that of more modern times when a paper was read on the "Physiology of Generation." In 1853, the profession was evidently torn by the conflict between "Allopaths" and "Homeopaths" for we read the following: "For as much as no common ground and support of sympathy exists between Homeopaths and Allopaths,—voted that, if Homeopaths are allowed to retain regular standing in the Massachusetts Medical Society, we request to be honorably discharged from all obligations or connections with the parent Society." In the same year the Secretary was directed to communicate with Longley with regard to certain reports that he "consulted with and approved of the course pursued by Homeopathic practitioners and justified their deeds". In 1853 it was voted that "the explanations of Dr. Longley are satisfactory". In 1860 it is stated that "an assessment of twenty-five cents was made to defray the expenses of the Society". In 1861 it was voted "to tender the services of the Society without charge to the families of those called into the service of the Country". In 1861 a committee was appointed to give "a history of the life, character and disease so far as is known of certain Fellows". In 1867, Richmond B. Root was admitted to the Society and remained a member until the time of his death in the present year. In 1867 the meeting was held at the Lakeside Farm of J. R. Nichols. In 1873 the address was on the "Physical Causes of the Death of Christ." In 1874 a testimonial of $50 was voted to Martin Root, for his service for many years as secretary. A fee table of a city near Haverhill gives some idea of the recompense received for medical work. This includes a house visit, 50 cents; a consultation, $1.50; each consultation after the first, 50 cents, and office visits 75 cents. "Rising at night and making a visit", $1.50.

There is one large envelope in the records of the Society filled with the obituaries of the greater majority of those deceased. The following extract from an old resolution is of interest in illustrating the method of expression of that time:

"Resolved that it is peculiarly proper for those who, by their daily avocation, become so accustomed to witness the sad results of disease and the triumphs of that fell destroyer of our race that such scenes fail to make that lasting impress, to pause, on every befitting occasion, and to notice, in an especial manner, those Providences by which any of our number are stricken down—that a due sense of our own mortality may be ever kept full in view; that we who survive may be prepared and ready to follow those who are called before us to their last account and to rest from their labors."

"Resolved: that while we bewail the removal of our late beloved associate ——— ———, we recognize and adore the hand of an unerring Providence in the hiatus which his death has occasioned, and we feel that we may rejoice to know that he who has gone was so well prepared for the summons sent for his removal from the scenes and duties of time to the awards and enjoyments of Eternity. . . . In the hope and

*Read at the celebration of the one hundred and fiftieth year of the Massachusetts Medical Society and the ninetieth year of the Essex North District Society, January 7, 1931, at Groveland.

†Anthony—Medical Examiner for Essex County, 4th District. For record and address of author see "This Week's Issue", page 682.

with the desire to meet him beyond the grave in that world where all tears will be forever wiped away and friends will meet to part no more."

Other characteristic lines of the period refer to the death of Dr. Saltonstall:

> "Sorrow, mute silence, through the village reign
> Hushed is the din of industry and mirth
> The sable throng, slow breathing, o'er the plain
> Swells full our sadness and gives anguish birth."

To go over the list of the members of the Society from Haverhill who have died in the last hundred years would be tedious to you because most of them would mean to you simply a name. I am going to mention only a few who stood out in their day: Sidney Drinkwater, who died in 1891 at the age of seventy-nine years; Jeremiah Spofford of Groveland, very active in Society matters, who died in 1881; Martin Root of Georgetown, secretary of the Society for many years, who died in 1880; William Cogswell, a strong personality, a power in politics and a much beloved physician, who died in 1891. In the early days of his practice Cogswell would leave Georgetown, where he first settled, and make his morning calls through Bradford, Ward Hill, North Andover, the Boxfords, East Haverhill, Atkinson, Plaistow, Westville, to West Parish and Haverhill proper, dining somewhere en route. George Cogswell, his uncle, who died in 1901, was one of the leaders of his day. In 1881, before I entered Medical School, he taught me anatomy, having been then, for many years, retired from active practice. His knowledge was so thorough and complete that I have heard him do, what I think hardly a man among my hearers could do, name all the foramina at the base of the skull with the nerves coming from each and the muscles of the back, including the smallest ones recorded. There being on those days no anesthetic, to amputate a man's leg meant that the patient would be first given a large amount of whiskey and then held by four or five strong men while the amputation was done, a surgical feat that required both courage and speed. I have heard him describe how one circular sweep of the knife divided the skin, how then a quick, backward dissection was made for a flap, a circular cut to the bone was made in one circular motion of the wrist, the muscles pulled back and the saw used.

George Cogswell, who was born in 1808, was, in addition to being a physician and surgeon, the president of the Union Bank, now the First National, and at one time had charge of the Haverhill and Newburyport Railway, which he lifted from financial depression. He was also president of the Board of Trustees of Bradford Academy and the original founder of the Essex North Medical Society.

Referring again to William Cogswell, he related to me an anecdote regarding an operation for which he gave ether while Howe, another surgeon of the day, operated. At the close of the operation Howe said, "Well, William, what is the patient's condition?" "Oh," Cogswell replied, "He died several minutes ago." "Why William, why didn't you tell me?" "Well," Cogswell replied, "you were doing such a good job that I hated to stop you before, particularly as I knew the wound would have to be sewed up anyway."

Rufus Longley, a prominent physician of his day, was the object of a long letter in the *Essex Banner*, criticizing the fact that in the latter days of his life he invited others than Unitarians to come to his bedside,—the fact being, as was afterwards brought out, that he said that he "loved the Christian Heart, whether it be Catholic or Protestant, Unitarian, Baptist or Methodist".

Moses Nichols, who was born in 1799 and was graduated from Harvard in 1815, served for a while as apprentice to an apothecary, for which service he received $40 a year. In 1878 he founded the Public Library in Merrimac.

In 1876 Ralph Huse of Georgetown showed a case to the Essex North Society illustrating the "Use of an Aspirator in Diseases of the Chest." In 1890 passed away Crowell, who, besides being an active practitioner, was an influential member of the Center Church, a poet, polished and well versed in literature. In 1911 Maurice D. Clarke died. He was one of the leaders of the profession in Haverhill, secretary of the Haverhill Medical Club and, for many years, of the Essex North Medical Society. His type is best illustrated by the fact that I have frequently witnessed that, at a medical meeting where discussion was active and some bitterness manifested, he would remain silent until, at the end of the discussion, someone asked his opinion; then, clearly, without bias, and emphatically, he would express his opinion, and almost always carried conviction to his audience.

In 1920 Duncan MacDougall died. He was one of the leading physicians connected with the S. H. Gale Hospital, and had a large practice in this vicinity. He received more than local attention at the time that an article was published in one of the Boston papers in which the doctor set forth his experiment by which he thought he demonstrated that the soul was a definite physical entity. He placed comfortably on scales a dying man and reported that, at the instant of death, the scales recorded a loss of 3/4 of an ounce. The doctor ventured the opinion that between the time of death and burial the soul would be separated from the body by about 9 million miles. If the doctor was right in his conclusion, we, if immortal, need not worry much about having to attend, in spirit form, the sad hour of our funeral exercises.

In 1921 the profession lost from its membership Ira E. Chase, who, trained in homeopathy, later joined the Massachusetts Medical Society. In addition to his professional activities, Dr. Chase was very prominent in the affairs con-

nected with the Methodist Church and Tilton Seminary.

John F. Croston died in 1921. From an humble origin, by dint of hard work and perseverance, he obtained an adequate medical education and developed one of the largest practices in this vicinity. Positive in opinion but kindhearted, he spared himself no way in his work. In addition to his professional work he served the city, the county and the nation in various civic duties. For about twenty-five years he was Medical Examiner for the 4th Essex District, for several terms a member of the School Committee and of the Board of Health. In the late war he served as a member of one of the local boards. His death was undoubtedly hastened by his inability, or unwillingness, to lessen the strain of strenuous work as his years advanced; at least he died in the harness at a time when his influence was at its maximum.

The older practitioners had to adapt themselves to the circumstances of the case and get along largely with what facilities were found in the homes of their patients, the Massachusetts General Hospital being the nearest hospital for critical cases. However, in 1880 the city of Haverhill was authorized to erect, establish and maintain a hospital to be called the Haverhill City Hospital and, in 1898, the name was changed to the Hale Hospital. In 1914 General Stephen Henry Gale left to the city the building and land used as the Children's Home and, with additions since made, there came into existence the Gale Hospital. Besides these institutions the City Infirmary connected with the City Farm, the hospital conducted by Dr. Benson, and the one by Mrs. McVey furnish additional facilities. Most of the physicians are connected with one or another of the hospitals, and great benefit has been derived both for their patients and for themselves by the establishment of these institutions.

There have been many changes in the practice of medicine since I first hung out my shingle in June 1888. First, the method of transportation has, of course, entirely changed. When I began to practice, I kept a horse harnessed on the barn floor, where for many months he had undoubtedly one of the softest jobs in equine life. As business increased, two and finally three horses made up the string. One would be driven in the morning, the second in the afternoon. The next morning No. 1 would repeat his work while No. 3 filled in night work and occasional days off for the other two. I got a reputation for prompt response. I distinctly recall one incident. One afternoon, I received a telephone message from Groveland, stating that a man had just been pulled out of the river and needed immediate attention. It took but a few seconds to unhook the ropes from each side of the bit and I was off for Groveland Bridge. As I came round the last curve I saw Ros Wood, afterward Alderman and Mayor of Haverhill, waving frantically for me to hurry. With the whip in active service I reached his side, the horse being covered with lather. Tossing the reins to a bystander, I asked him to walk the horse up and down and then throw a light blanket over him, and inquired of Mr. Wood where the patient was. He informed me that the patient had come to all right, and, when I asked him why he had been in such a hurry, he told me that he had a bet of $5.00 that I would be there inside of thirteen minutes and, when I came round the corner, he had only two minutes in which to win.

There was quite a bit of rivalry between physicians in the matter of the quality and speed of the horses they owned. I had two, one of which could trot in 2:42 and the other in 2:40, the prettiest driving team I ever drew a rein over. Dennis was my wife's horse and, up to the limit of his speed, would travel without a break, even if the whip was laid across him.

One day, while driving up Main Street, Dr. Benson, who had a horse a little faster than mine, attempted to go by, giving me a most provocative grin as he did so. As the horses were traveling neck to neck, I cracked the whip in the air and brought it down on the back of Dennis. He simply made a little additional effort, while the horse driven by Dr. Benson went up in the air, and I won the race easily. I give these two personal incidents to illustrate the fact that the method of transportation used in those days had its interesting features, and, in many instances, the affection that developed between a physician and horse that he drove far exceeded any personal regard that today a man feels for his automobile. The horse may have been subject to spavins and saddle-galls, but he had no flat tires and he would start just as well, in fact a little better, on a morning when the thermometer was below zero.

The general practice of medicine and surgery has experienced many changes in the last fifty years. In the earlier days the physicians did not have the benefit of the abundant and helpful laboratory work which is now at their disposal, and the x-ray had not come into existence and been developed, to give the practitioner both the help and the worries that it can now furnish. Fractures were reduced, sometimes, by skilled men with great success, but a check-up could not be made upon the result, and an unfortunate end-result was regarded rather as the "act of God" than as due to the lack of skill on the part of the operator. During this period the humble appendix was lifted by the keen mind of Reginald Fitz from the unknown cause of many cases of "inflammation of the bowel" or of peritonitis to a definite place in the etiology of abdominal pathology. Gradually the gastro-intestinal series gave additional information not only along this line, but in the recognition and differentiation of other troublesome conditions, such as gastric and duodenal ulcers, malignancy and the various pathological

states connected with the gall-bladder, the urinary bladder and the whole urinary tract. I clearly remember that, when my mother died, having experienced an attack of "jaundice" for many months, four years previous to her final illness, which terminated in peritonitis, the physician who attended her bemoaned his ignorance, manifested, he thought, by the result of an autopsy which showed a stone lodged in the common duct and two others in the hepatic duct.

There was no differential blood count to aid us in diagnosis and pernicious anemia was diagnosed only by exclusion. This form of diagnosis was in the olden days of great importance and, as I look back upon my professional life, one of the greatest aids that I have received was obtained in the course given by Dr. Whittier at the Massachusetts General Hospital in which he emphasized this type of diagnosis, giving us many concrete examples on the floor of the amphitheatre. It is interesting to note that, within a year, the warning has been sounded by some physicians of high standing that the practitioner of today has been coming to rely too much upon the important adjuncts to diagnosis by exclusion, as valuable as are these aids, and has, perhaps, allowed his power of decision based on history and observation to become weakened. There has been a great advance in special lines; the brain has been explored with more safety, special operative procedures have increased the accuracy of abdominal work, the bronchoscope and laryngoscope have opened up new fields, the perfection of spinal anesthesia has enabled much work to be done that was previously forbidden, and the uncomfortable, and in some cases dangerous, effects of general anesthesia have, in many types of operation, been done away with. In the past, the practice of obstetrics was more or less of a nightmare. The advance of asepsis was a great help, the increased opportunity given for instruction in this branch under competent instructors has become invaluable. Fancy!—when I began my practice I had delivered three women in childbirth and these were the only cases that I had ever seen. It is probable that my personal experience in my first year of practice of sending for an older practitioner to confirm my provisional diagnosis of placenta praevia, which he informed me in a kindly way was simply the customary "bag of waters", was not so unique as might at first be thought. No longer are difficult forceps operations and Caesarean sections done in private houses, perhaps in hovels, on an operating table made by placing an ironing board on two barrels (an experience which fell to my lot, and in which, by the way, the patient made an uneventful recovery), but hospital facilities are provided which increase materially the probability of a successful outcome.

The Workmen's Compensation Act, however much it may be criticized in some details, has, none the less, placed in the pocketbooks of the profession in this vicinity many thousands of dollars which otherwise they would never have received. There has been a marked change in the conduct of physicians who have been drawn into cases requiring legal decision. Forty years ago, the physicians employed by opposing sides met to consider the case, but in a vastly different way than is the common practice of this day. No information was given by one to the other except what was obtained by direct and sometimes shrewd questioning. Essential facts were concealed and, when the physicians appeared in court, neither knew what the other might have found or what his opinion was to be. Some rather amusing situations arose from this state of affairs, as for example, where one physician stated that the examination of the eyes showed that both pupils were normal and reacted normally to light, and the other brought out the fact that one of the eyes was a glass eye; and another incident in which a physician testified that there were no injuries of note, and it was afterwards shown that his examination was made without removing any of the clothing while very serious visible and tangible injuries were demonstrated by his opponent, who had detected the tangible part through the clothing and thought it a rich joke to keep it to himself. Today the meeting of physicians in medico-legal cases is on practically the same basis as that of a consultation; all the facts are laid openly upon the table and almost invariably an agreement reached as to essentials, with differences minimized and usually relating to the question of prognosis only. This forward step has made the profession much more respected in the court rooms of the county and has taken away much of the reproach that formerly existed.

There is, as contrasted with the times of the past, an era today of good feeling between the members of the profession. Following the association of physicians founded here in 1836, in response to the natural desire to increase their knowledge and acquaintanceship by meeting together, and the establishment of the Essex North Medical Society in 1841, there came locally the establishment of the Haverhill Medical Club, restricted to twenty-five members, organized in 1887 and, later, the starting of the Pentucket Association of Physicians, open to every reputable practitioner in Haverhill and vicinity. These organizations have functioned well both in aiding fellowship and increasing special knowledge, but in no way have they tended to lessen the interests in, or the importance of, the District Society; in fact, the contrary is the case, for, by their stimulation in the search for knowledge, they have given their members an increased appetite along these lines, and the larger attendance at the district meetings is probably the best proof of the conclusion I have drawn.

Today the older members in the profession look back without regret upon the hardships and difficulties that attended the earlier days

of practice. They feel that many of these things, hard to endure at the time, were not so difficult because they could not be contrasted with the great advance that the younger generation comes in contact with as they start upon their careers. They feel, also, that these things may have added to physical vigor and perhaps to mental acuity—none the less they are glad that those who live today are able to practice in the easier manner, and with much more to help them in the various perplexing problems that are constantly presented for solution. The members of the Essex North in this vicinity have been, almost without exception, honorable practitioners, upholding a high standard of integrity and of professional worth. They have done their bit in the attempt to relieve the sufferings of humanity, to aid in the civic, religious, and social life of the communities in which they reside, and with confidence they entrust the future of the Society to those who are coming up to take the places that become, each year, one after another, vacant. Speaking for those who are over seventy years of age, I ask for the support of the Society in its aims and purposes that have been bequeathed by the men of the past generation. We look to you to carry it on, making it increasingly valuable both to yourselves and to the citizens as a whole, and, speaking for these older men, I say to those who follow us,

Morituri te salutamus!

THE STORY OF ESSEX NORTH DISTRICT MEDICAL SOCIETY IN LAWRENCE, METHUEN, ANDOVER AND NORTH ANDOVER FROM 1841 TO 1930*

BY J. FORREST BURNHAM, M.D.†

AFTER listening to the excellent papers of Drs. Snow and Anthony, both based upon a perusal of the records of Essex North, I shall try to report such parts of the history as may have escaped being told.

A part of the plan is to extract portions of the records of Essex North and the result may resemble what was said by the individual, who upon being presented with a Webster's dictionary, and later upon being asked by the donor as to how he liked it, replied: "I like the book and have read it all. I found the story very interesting but quite disconnected."

The territorial changes which have occurred in this vicinity are not without interest. Haverhill was settled in 1645 and included the land now in the confines of Methuen, and that part of Lawrence north of the Merrimack River. Andover, which dates from 1646, included what is now North Andover and that part of Lawrence south of the Merrimack. In 1726 Methuen was incorporated and taken from Haverhill. In 1847 Lawrence was established as a town, comprising parts of Methuen and Andover. The baby of them all was North Andover, incorporated in 1855 and the territory extracted from Andover.

Essex North was chartered in 1841, and was the eighth, in order, of the eighteen District Societies of the Massachusetts Medical Society. Our neighbor Essex South, and Worcester were the first two organized, under date of 1804.

STATISTICS

In the 89 years of its existence, there have been 153 deaths and the ages at death of all except five are recorded. The average age at death is 57 years. Dividing the 89 years into halves, these interesting figures are shown: During the first forty-four and one half years there occurred 41 deaths, or about one annually. During this period the average age at death was 48 years. There were 112 deaths during the latter half, or from two to three deaths yearly, with a larger membership. The average age at death was 60 years. This gain of twelve years may be partly accounted for by the greater longevity of all citizens in our later years, and partly by the greater conveniences now attached to the practice of medicine.

The youngest physician who died was W. H. Foster of Merrimack, at the age of 24, in 1880, and George Cogswell of Bradford was the eldest, at 93, in the year 1901. There have been 12 who survived for 80 and more years, or about eight per cent. of all deaths. These figures indicate that of this assembly today, some seven of us may reasonably expect to attain four-score years in this beautiful world.

Two of our present members have had a grandfather and a father who were members of Essex North, i.e., Drs. R. R. Root of Georgetown and G. B. Sargent of Lawrence. The fathers of the following named members of Essex North were also honored members of bygone years; Drs. R. C. Hurd, T. R. Healy, F. W. Snow, and L. C. Peirce of Newburyport, Drs. F. D. McAllister and A. F. Shea of Lawrence, and Dr. Joseph Kittredge of North Andover.

The two senior members of Essex North in point of years of membership are Drs. Joseph Kittredge of North Andover and C. H. Crawford of Lawrence, but in both cases the term has been broken through absence from this District. The senior in continuous membership is Dr. C.

*Read at the celebration of the one hundred and fiftieth year of the Massachusetts Medical Society and the ninetieth year of the Essex North District Society, January 7, 1931, at Groveland.

†Burnham—Secretary, Essex North District Medical Society 1907-1930. For record and address of author see "This Week's Issue", page 682.

E. Durant of Haverhill, with 45 years to his credit.

The first physician to settle in Lawrence was Moses L. Atkinson, who was a member of Essex North, and who opened an office on Turnpike Street in January 1, 1846. This street is now Broadway and it was a part of the stage coach road from Boston to Manchester, N. H.

EXTRACTS FROM RECORDS

David Dana was the first Lawrence name mentioned in the old records, having been elected a Councilor in 1849. Later, he was an attending physician at the Lawrence General Hospital and his photograph adorns the walls of the Flanders Medical Library of that institution.

Our first meeting at Lawrence was held in July 1849 and was recorded as at the Merrimac House.

In October 1850, at a meeting at Georgetown, it was voted to present a remonstrance to the parent society, opposing the petition of the members from Lawrence, Andover and Methuen to be annexed to Middlesex. Looking back from today's standpoint, it seems as though it had been wise to make no change.

In 1851, the name of Stephen Huse, the first member from Methuen appears and he was elected vice president. The present meeting notices of Grecian Lodge, A. F. and A. Masons, carries the record that he was Master of the Lodge for nine years, an unusual honor.

An Andover name is first recorded in 1851 when Samuel Johnson was admitted. On this date also, W. D. Lamb was elected a Councilor. He died in 1912 aged 88 years, and was the coroner, before the days of our better present medical examiner system, at the severe disaster of the fall of the Pemberton Mill, at Lawrence in 1860, when 88 were killed.

In 1852 and for many years after, the delegates to the annual session of the American Medical Association were elected by the district societies. At that time Essex North was entitled to five. With similar representations through the United States, the meeting must have been a huge affair, if all attended. Under present by-laws, Massachusetts elects six to represent it and the attendance is 100 per cent., which is a better system.

In 1856, in September, the meeting was held at the home of G. W. Garland of Lawrence. This building is now standing and is at the northwest corner of Common and Lawrence Streets.

The name of the first recorded North Andover physician appears in the story of the meeting of May, 1864,—O. O. Davis. He is remembered by some of his townsmen now living.

Our present Dr. Joseph Kittredge of North Andover has an unusual family history in medicine. He is the eighth consecutive male generation as a physician. The first four were located in Tewksbury, Mass., and the second four were located in the house in North Andover, built by the fifth in 1784. His daughter is a physician, located in New York, and she is the ninth generation. In 1869 this society held its meeting in this wonderful old Colonial mansion, upon invitation of Dr. Joseph Kittredge (seventh) and Dr. W. J. Dale of North Andover.

The meeting of January, 1873, was held at the Lawrence Jail upon invitation of Horatio G. Herriek, Sheriff of Essex County, and was called at 9.30 A. M., which must have required early rising upon the part of Newburyport and Byfield physicians. Upon this date appeared the following in the records: "A copy of the *Lawrence American*, a newspaper published in Lawrence, was shown, which contained an advertisement entitled 'The Physiological Prophylaxis of Smallpox and Varioloid,' signed by Dr. James H. ——, M.D., of Andover, a Fellow of the Massachusetts Medical Society. After examining the ungentlemanly, absurd and evidently dishonest design to gull the community without equivalent, it was voted unanimously, that the article be passed to the Commissioner on Trials." It was appropriate that this matter should begin in a jail.

At the January, 1875 meeting, Dr. H. of Georgetown preferred charges against Dr. J. of Lawrence, and a committee was appointed. At the next meeting this committee reported and exonerated him of all charges. Professor Churchill of Andover, a professor of elocution at Phillips Academy, was given a vote of thanks for the entertainment he furnished at a summer meeting which took the form of an excursion on the salt water.

At 1880, records show the first mention of any present member, when Joseph Kittredge of North Andover was admitted.

The Society offered a prize in 1885 for the best paper among its members. The $25 offered was divided, later, between O. T. Howe of Lawrence upon the subject of "New Remedies" and R. C. Huse of Georgetown upon "Old Remedies."

The following are two excerpts from the obituary notices of two of our members whose Civil War records are notable. In 1900, this appears regarding C. N. Chamberlain of Lawrence: "His father was a physician and so were two brothers. He married a physician's daughter. At the breaking of the war in 1861, he volunteered (age 32 years) and was appointed surgeon of a Massachusetts regiment and served until 1865. He was a medical inspector of an army corps and was in charge of a field hospital at Gettysburg. In 1864 he also was given charge of the Dale Army General Hospital at Worcester."

W. J. Dale of North Andover died in 1904 and the quotation regarding him follows: "Dr. Dale died aged 88. His great-grandfather fought at Bunker Hill and his grandfather at Lexington. His father was a surgeon in the

War of 1812. In 1861, at the age of 46, he was commissioned Surgeon General of Massachusetts. In 1863, he was raised to the rank of Brigadier-General and the Federal authorities gave his name to a general hospital at Worcester. He was located at Boston and had charge of all matters relating to the sick and wounded who were sent home."

The matter of defective credentials was in evidence, as this note shows: "May 1870—Resolved, that in consideration of the bogus credentials and diplomas of various kinds, medical among the rest, which are now sold at cheap rates by self-constituted individuals, that in the opinion of this Society, the Suffolk District should continue the practice of examining personally all applicants whose professional attainments are of a doubtful character." Thanks to the complete records of the Council on Medical Education and Hospitals of the American Medical Association, the standing of any questionable diplomas is usually obtainable.

The matter of sectarian medicine was a thorn in the flesh of our elder professional brothers. That matter has been happily settled almost everywhere now, and nowhere better than in Massachusetts. In 1907, Essex North opened its doors to all honorable M.D.'s. Eclectism and thomsonianism have long gone. Thanks to the scientific minds and excellent judgment shown by the management of the Boston University, the Medical School (formerly classed as homeopathic) adopted non-sectarianism in 1918. As an equal evidence of the high character of the same physicians and laymen, the name of Homeopathic Hospital has been changed to Memorial Hospitals, thus obliterating its last open tie to sectarian medicine, and thus giving a clean road for united scientific medical progress to the three Massachusetts medical schools. There remain but two homeopathic schools in the country, one in New York and one in Philadelphia, and it is hoped that they may see the light ere long.

That the attempt to instruct the public properly on health matters is not a recent idea, as some suppose, is well shown by a vote passed in 1854 as follows: "Voted that Dr. Perkins of Newburyport be requested to report a paper calculated to enlighten the community upon medical subjects."

The early members of Essex North appreciated advances in medical knowledge, as is shown by a story of a discussion in 1882 of the subject of "The Antiseptic Method of Surgical Operations."

In 1883, the proposition of permitting women to become members of this Society was argued at a meeting. The matter was finally laid upon the table.

As an example of the high aims and character of the early members of Essex North, the following is quoted under date of 1872. "Dr. G. W. Garland of Lawrence presented the following: Some expression is due from the Society to one of its members for the honor he has conferred upon it by his recent researches and for the very valuable matters which he has brought before it from time to time. Resolved: that the members of Essex North appreciated the scientific and self-imposed labors of Dr. Perkins of Newburyport, for the good of our profession, and it congratulates him on the high position he has attained as a scientist, and extends to him its warmest thanks for his very able paper on vegetable organisms read before the Society and which has been published in the proceedings of the Massachusetts Medical Society."

Speaking thus far for the old times, it is equally fair to state that Essex North has in later years acted in a commendable and progressive manner. In its present membership in the territory about Lawrence with its 113 eligible members, there are but five non-members, a percentage of 96. In the whole Essex North district the percentage of membership to eligibles is 92, which is probably greater than any district society in the State.

In matters of economic, ethical, and social value, we have taken an advanced stand. The prescription of nostrums has been condemned; the work of the Council on Pharmacy and Chemistry of the American Medical Association has been explained; the participation in lodge and contract work wherein physicians are guilty of caring for patients who properly belong to other medical men has also been shown to be an unfair and wrong action; the impropriety of making ordinary life insurance examinations for substandard fees has been explained as unprofessional; an up-to-date fee table has been supplied; and finally the inequalities of many parts of the operation of the Workmen's Compensation Act have been made plain and corrections advised.

Also, undesirable newspaper publicity has been shown to be against the best interests of patient and physician.

Essex North's part in the World War consisted of a contribution of 46 of its members who were commissioned in the Army and Navy. This was an enrollment of about one in each four members. One half of those who were commissioned were over the draft age, one notable instance being that of a loved ex-president who put on the uniform at the age of 54.

In conclusion, it is perhaps fair to say that if there is anything worth emulation or commendation in the work of Essex North during these long years, it can, in larger part, be credited to the high aims and efforts of those Yankee doctors of this section of Massachusetts, who had a willingness to work and a New England conscience.

MEDICAL PROGRESS

PROGRESS IN PEDIATRICS

BY JOHN LOVETT MORSE, M.D.*

COELIAC DISEASE

THIS term, if it is used to describe a single disease or symptom-complex, is an irrational one, because the definition of "coeliac" is "relating to the abdomen, or to the cavity of the abdomen". It applies equally well to acute appendicitis, tuberculous peritonitis and ovarian tumors. Terms used synonymously are "chronic intestinal indigestion" and "intestinal infantilism" (Herter). They are little, if any, more satisfactory. All are applied to a fairly characteristic symptom-complex, which is summed up best, perhaps, by Fanconi, as follows:

1. Large, characteristic stools.
2. Large, fluctuating abdomen.
3. Hydrolability.
4. Impaired development.
5. Osteopathy.
6. Hypotonia.
7. Anemia.
8. Characteristic disturbances of metabolism.

He describes three types of stools, two of which seem important. 1. "The whitish, fat, shining stool. This stool is very rich in fat, part of the fat being soaps and fatty acids. Lugol's test is usually negative. The reaction is often alkaline, the odor foul." This is the type of stool originally described by Gee and apparently is still the type most often seen in England, as it used to be in this country. 2. "The strongly acid, fermenting, frothy stool with positive Lugol." This is the type which has been most common in this country in recent years. Sylvester was the first to recognize its importance in this community. Fanconi correctly states that, while there are two types of stools, it is impossible to divide them absolutely, because both fat and carbohydrate digestion is disturbed in both, but in one more than in the other. He also notes that the character of the stool depends on the kind of food taken.

It is very hard to know just how to approach the discussion of this symptom-complex. It may be as well, perhaps, to start with the stools, considering first the large, white or gray stools. It is generally agreed that they are very largely composed of fat in some form. Svensgaard states that fat makes up from 10% to 25% of the dried feces; Miller says 25% to 30% up to three years and 20% above three years. In this condition Svensgaard, for example, found 50% to 60%, Poynton and Cole 48.2% to 50.6%, and Miller 30% to 80% of the dried feces made up of fat. This fact at once suggests that the cause of the trouble is some abnormality in the secretion of the liver. Miller attributes the essential fault to a deficiency of the bile salts, but offers no proof. Taylor found bile salts present in the duodenal juice of three patients. Bauer found bile in the duodenal content in the same amounts as in the normal child. Miller notes that the color of the stools returns, if fat is cut out of the diet, and that there is never jaundice.

Poynton and Cole found, moreover, that the administration of the bile salts for more than a month did not diminish the fat content of the feces. Miller admits, however, as has been shown chemically by many authors, that there is no lack of bile pigment in the stools; it is simply masked by the large excess of fatty acids. It may, moreover, be changed over to the colorless leucohydrobilirubin. Taylor states that the liver is usually small. He found in the duodenal juice of one patient, not anemic, large amounts of urobilinogen, which he thought meant diffuse liver pathology. He also found leucin and tyrosin in the urine of one child, three months before death, which he thought also meant disease of the liver. No changes, however, except an excess of fat, have been found in the liver postmortem by anyone. The small size is presumably due to inanition. Fanconi says that the size of the liver corresponds to the length, not to the age or body weight. He believes that the fat in the liver is the result of the anemia and, perhaps, a disturbance of the intermediary fat and carbohydrate metabolism. Taylor and others have found the bile salts useless in treatment.

Everyone agrees that the greater part of the fat in the stools is split. Poynton and Cole, for example, found 74% to 78.6%; Taylor 64% to 88%. Lehndorff and Mautner have tabulated all the reports on fat in the stools. These show that most of the fat is split. These figures seem to show that there is no deficiency in the pancreatic secretion and that the trouble cannot be due to disease of the pancreas. Nevertheless, several authors claim that it is. Bramwell's case of "pancreatic infantilism", which recovered and remained well after the administration of pancreatic extracts is not convincing. The symptoms were not those of "coeliac disease", simply failure of development and diarrhea. Thomsen's case, abstracted by Bramwell, was probably malignant disease of the pancreas. Freeman describes four cases with typical gray stools and the bacteriologic flora of Herter, in one of which the stools improved when pancreatic extract was given. The improvement may as well, however, have been simply a coincidence. Bauer

*Morse—Professor of Pediatrics Emeritus, Harvard Medical School. For record and address of author see "This Week's Issue", page 682.

found lipase, trypsin and amylase present in the duodenal contents in the same amounts as in a normal child, used as a control, and with the same variations in relation to both fasting and feeding. These ferments had the same digestive powers. Taylor found amylase and trypsin in the duodenal contents of three cases, but does not mention lipase. Incidentally, the achylia so often found in this condition would not affect the "vagal" pancreatic secretion, which is dependent on the entrance of the stomach contents into the duodenum, not on their acidity, and which carries the major part of the enzymes. Few autopsies have been performed in this condition. The reports of most of these are not very satisfactory. In most instances the pancreas was found to be normal. In two or three cases (Still, Taylor) some excess of fibrous tissue or small cell infiltration, especially about the ducts, has been found. These changes are, however, no more marked than those found very commonly in infants and young children dead of malnutrition from any cause and are, therefore, unimportant. It seems evident, therefore, that disease of the pancreas or a deficiency or enfeeblement of its secretions is not the cause of this symptom-complex.

It has always been assumed, or taken for granted, that the large excess of fat in the stools was due to a failure of absorption in the intestines. Bauer, however, found it experimentally, in one instance, as good as in the normal child. It has been shown also that the excretion of fat in the stools is often more than the intake. This excess has been attributed to the presence of desquamated epithelium and bacteria. Moncrieff and Payne suggest that "coeliac disease is a primary disorder of fat metabolism, associated with an increase of the fat in the blood and in the feces, where possibly it is being excreted". They base their suggestion primarily on the work of Hill and Bloor and Sperry and Bloor, in 1922 and 1924. Bloor and his associates sum up the literature and report feeding experiments in animals with analyses of the blood and food fat on a fat-free diet and on diets containing various amounts and kinds of fat. They also made similar analyses when animals were given foods containing fats of various melting points and iodine numbers, comparing the composition of the food fat with that of the fecal fat. Both articles should be quoted in their entirety to really give a correct idea of their arguments. In brief, they say that fat is to be found in the feces, whether or not there is fat in the food; fat in the food increases the fat in the feces, but only to a comparatively small extent; the composition of the fat in the feces is, to a great extent, independent of that of the food fat, being much the same, no matter what fat is ingested or whether no fat is taken. They also say that the marked similarity in the lipoid composition of the blood and feces makes it probable that the fatty material of the feces has its origin largely in the blood. They admit, however, that there are at least four sources of fat in the feces: intestinal bacteria, desquamated intestinal cells, unabsorbed lipoid residue from the food, and excretion from the blood either directly or indirectly through the bile and other digestive secretions. It seems a reasonable criticism to suspect that they have underestimated the importance of the first three sources and overestimated that of the fourth. At any rate, they have not made any statements positive enough to lead one to believe that they would consider their results definite enough to justify Moncrieff and Payne's statement that, on the basis of their work, "a possible explanation for coeliac disease lies in the high blood fat associated with excretion in the feces of fat, which has leaked from the blood. In other words, the primary fault in coeliac disease is not a malabsorption of fat, but a malutilization of fat, a defect of fat metabolism possibly analogous to the defective utilization of sugar in diabetes." They say that it is suggestive that in many cases of coeliac disease carbohydrates are not normally dealt with. They refer to Poynton and Cole's case of coeliac disease and diabetes mellitus. There is nothing in the history of this case, however, to suggest anything more than a coincidence between the two diseases. They also say that a high blood fat is found in many cases of diabetes in which there is a failure of fat as well as of carbohydrate metabolism. They suggest that "coeliac disease is a primary disorder of fat metabolism associated with an increase of the fat in the blood and in the feces, where possibly it is being excreted".

They found the percentage of fat in the blood of five normal controls, 2½ hours after a light meal, to vary between .142 and .208. In one probable case of coeliac disease, not doing well, 2½ hours after a small meal containing no fat, the percentage was .530. In three cases of coeliac disease which were improving it was .275- .275- .280. In four cases of coeliac disease, 3 hours after a meal very low in fat, it was .510- .620- 1.150- 1.170. Bauer, however, in one case found the total blood fat, less cholesterol, and the cholesterol, within normal limits. Fanconi studied the blood lipoids both in normal children and in children with coeliac disease. He found that during fasting the neutral fat, free cholesterin and cholesterin esters were all diminished in the children with coeliac disease. In the one case in which he studied the digestion lipemia the blood fat curve was much flatter than in the normal children, which he interpreted as being due to insufficient absorption. The maximum was reached later (4 to 5 hours instead of 2 to 4 hours), which also speaks for delayed absorption. During normal digestion lipemia the cholesterin also increases somewhat. In coeliac disease it did not increase, it

diminished. He also made studies in both children and animals as to the effect of injections of oil on the blood fat and serum lipase. He made 19 determinations in coeliac patients and found that it was evident that there was no relation between the disturbance of the fat digestion and the lipase constant.

It seems safe to believe, therefore, until further evidence is adduced to the contrary, that the large excess of fat in the stools is due to defective absorption rather than to excessive secretion from a disturbance of the fat metabolism. It is presumably true, however, that a part of the excess of fat is due to excessive desquamation of the intestinal epithelium as the result of irritation of the mucosa, and another part to an excessive number of bacteria in the intestinal contents. This part is more important, however, in the cases in which there is marked carbohydrate fermentation in the stools.

The strongly acid, fermenting stools with positive Lugol are usually yellow or light brown, although sometimes grayish yellow. It is generally agreed that the chief abnormality in this type is fermentation of the carbohydrates and that the malabsorption of fat is relatively unimportant. In all probability the fat in these stools, which is present even when little or no fat is taken in the food, comes from desquamated epithelium and the bodies of bacteria. Sylvester has raised the question whether or not part of the fat may not be formed from starch as the result of bacterial activity. The importance of starch in this type of this symptom-complex has not been generally recognized, attention having been directed mainly to the sugars. Sylvester was among the first, if not the first, to recognize its importance. Morse, Talbot and Hill, in Boston, have frequently called attention to it, as did Howland, in Baltimore, in 1921, but in general it has been overlooked.

It is even more difficult with the carbohydrates than with the fats to know just what the trouble is, because of the fermentation which goes on in them. It is hard to know whether the inability to utilize them is because they are not absorbed, because they are destroyed in the intestines by fermentation, because the acid products formed by the fermentation irritate the intestines, stimulate peristalsis and hurry them out before they can be absorbed, or what is the relative importance of these three factors. Schaap found carbohydrate worths in the stools higher than those found in any other condition. He calls attention to the difficulty of measuring the carbohydrates because of the destruction of the carbohydrates in the bowels by bacteria. Nelson, as the result of observations on four cases, states that there is an inability to utilize starches and the more complex sugars. Fanconi says that starch is poorly digested because the diastatic ferments function poorly, but offers no proof. Svensgaard found that starch, in the form of wheat bread, produced but a slight increase of the blood sugar concentration.

Fanconi says that in severe cases the absorption of the monosaccharides is impaired and hence the blood sugar is low. He says that the fasting sugar is lower than in the normal child. The curve falls instead of rising or reaches the normal height and remains up for several hours. He says that we must assume that when the blood sugar diminishes at first, the sugar-splitting action of the liver immediately overcomes the absorption from the intestines. If the curve remains up, it may be due to slow absorption or diminished glycolysis. Svensgaard, however, found that the blood sugar reacts normally after injections of adrenalin, showing that the mobilization of sugar is normal. He found that in two cases the blood sugar rise after 1, 1½, and 2 grams of glucose per kilo was less pronounced than in normal individuals. The curves were "normal" after 4 grams per kilo. Jensen, however, got the same low curves in children of the same age with a variety of complaints, not necessarily digestive, and concludes that low sugar curves at this age with this dosage are not uncommon. MacLean and Sullivan studied 14 cases between 15 months and 4 years of age. All showed a flat sugar curve after dextrose by mouth. Larger amounts of dextrose, galactose, dextrose and galactose, and fructose failed to cause an increase. Curves similar to those of normal children after dextrose were obtained after the ingestion of equal parts of fructose (levulose) and dextrose. This suggests a more normal metabolism of invert sugar (dextrose and levulose). Svensgaard found the blood sugar curve normal after levulose. MacLean and Sullivan say that simultaneous examinations of the urine show that the flat sugar curve is not due to a lowered renal threshold. That some sugar is absorbed, is shown by the results of blood sugar examinations at 15 minute intervals. Furthermore, after galactose is given, sugar appears in the urine, proving absorption. Svensgaard, giving adrenalin injections together with the ingestion of glucose, found a marked and protracted rise in the blood sugar concentration, showing that the mobilization of sugar is not interfered with. Finally, Lehndorff and Mautner on repeated examinations never found the blood sugar outside of normal limits.

What all this work on the carbohydrates means is not clear, at least to me. The only practical point seems to be that levulose is absorbed and probably utilized better than the other sugars.

Carbohydrate fermentation in the intestines brings up Herter's explanation of this condition, which he termed intestinal infantilism. He assumes that the absorptive power of the intestines is impaired. This, he thinks, is due to a chronic inflammatory process, implicating especially the lower lengths of the small intestine

and, perhaps, the contiguous portion of the colon. This inference is based on the presence of mucus and epithelial cells in the intestinal contents and on resemblances to chronic saccharobutyric putrefaction in adults, a condition in which there is direct evidence of congestion and inflammation of the mucous membrane of the ileum and colon. He believes that the inflammation of the intestinal tract in infantilism can be confidently attributed to the presence and dominance of an unsuitable intestinal flora. The few autopsies which have been carefully done in this condition do not, however, corroborate Herter's assumption of a chronic inflammatory process in the intestines. Block, however, in two cases, in which the organs were preserved by the injection of a 10% formalin solution soon after death, while he found no destruction, ulceration or degeneration in the gastro-intestinal tract, did find subchronic inflammation in the stomach and intestines with a great number of mucous cells in the wall of the colon.

Herter believes that the unsuitable bacterial flora is not only the cause of fermentation of the carbohydrates, but also of excessive putrefactive decomposition of proteins. This results in the formation of indol, phenol and other similar products. He thinks these cause a chronic intoxication of the neuromuscular system. He says that the dominant bacteria of the colon and probably of the ileum are gram-positive organisms belonging to the groups of organisms which may be designated as the B. bifidus type, the B. infantilis type and the coccal type. Noteworthy is the absence of organisms of the B. coli and B. lactis aërogenes types. That is, there is an overgrowth and persistence of the flora of the nursing period, especially of the B. bifidus. Herter's findings and conclusions have not been generally accepted, however. It is difficult to account for the symptoms of two antagonistic forms of bacterial activity. It is hard to see why the symptoms increase when carbohydrates are added and why a high protein diet does not increase putrefaction. Brown and his co-workers carried out a long bacteriologic investigation along the lines of Herter's work. They could not confirm Herter's belief that a predominantly gram-positive, aciduric intestinal flora of the B. bifidus type is characteristic of chronic intestinal indigestion. Neither could they confirm Herter's isolation of B. infantilis as a separate entity. They did believe, however, that they were able to improve the condition by the administration of streptococcus lacticus.

Many authors speak of achylia in this condition. It is not clear just what they mean by this term, presumably a diminution in the secretion of HCl. Block, in six cases, found "achylia gastrica" for several months in three, in two of them for a year; in the other three it changed to hypochylia. Taylor found HCl absent in all of five cases examined. In two the anacidity persisted in spite of improvement in the general condition. Bauer found achlorhydria in one case. Marriott found the gastric acidity in a child of two years, who was doing badly, from 5.5 to 6.0 after a meal of breast milk, the normal being 3.6. Six months later, when the baby was improving, the acidity varied from 3.0 to 3.3 after a meal of cow's milk, the normal being 5.1. Fanconi notes, however, that achylia is not an obligate symptom and that there is no relation between the acid content of the stomach and the severity of the disturbance of nutrition.

Clinically, all agree that protein is better absorbed and utilized than the other food elements. Experimentally, however, it is evident that the absorption of proteins is also impaired. Brown, Courtney, and MacLachlan found large losses of nitrogen in the stools, Freise and Jahr 17.3% and 12.5% protein in the stools compared with 9.3% and 9% in 2 normal controls. Fanconi states that the normal child eliminates from 13% to 20% of N in the stools and coeliac patients up to 50%. He thinks that this is probably due to the increased intestinal secretions, because only a small part of the N in the stools comes from the food, and that it is not reasonable, therefore, to attribute the increased amount to impaired absorption. Freise and Jahr found that in their cases additional protein was well utilized. MacLean and Sullivan, however, found the non-protein nitrogen of the blood low in 4 cases.

It is quite evident from the above discussion that, while there is undoubtedly an excessive excretion of all the food elements, especially of fat and carbohydrates, as well as of the salts (which will be taken up later), and a great impairment of their utilization, the cause is not at all plain. It is probable that Herter was wrong in his conception of a pathognomonic bacterial flora. Except in the case of HCl there is no experimental evidence to show that there is any diminution in the quantity of the digestive ferments or impairment of their quality. The findings at the few autopsies which have been carefully worked up show nothing of importance in the digestive tract. The changes which have been found in the intestinal mucosa are easily explainable by the irritation caused by the fermenting intestinal contents. Block, who studied 2 cases injected with 10% formalin soon after death, found no destruction, ulceration or degeneration of the gastro-intestinal tract. Microscopically, there was a sub-chronic inflammation of the stomach and intestines with a great number of mucous cells in the wall of the colon. The glands were preserved in the stomach and intestines. The parietal cells in the ventricular glands were without secretory capillaries, and in only a few secreting cells were any granules to be found. This inactive condition he believes to be a sign of digestive insufficiency. His findings have not been corroborated; if they are

true, they give no information as to their cause. It is easy to attribute an assumed weakness of the digestive secretions to a constitutional feebleness of the whole, or a part of, the digestive apparatus. This may, or may not, be true; there is no proof of either contention. Clinically, this symptom-complex often seems to follow, and apparently be the result of, a prolonged diet excessively high in fats or starches, some parenteral infection, or a combination of the two. Such diets and such infections are, however, very common and this symptom-complex is uncommon. Some other etiologic factor, predisposing to the development of this symptom-complex, must be assumed, therefore, to be also present. In other instances the symptoms develop quickly and without any apparent cause. A more careful study of the early symptoms than has hitherto been made might be helpful in determining the etiology. So, also, would be a study of milder forms of this symptom-complex. Thus far, little attention has been paid to any but those presenting the full-blown type.

Freise and Jahr, during their studies of this symptom-complex with the Roentgen ray, noticed that the food passed very rapidly through the stomach, small intestines and proximal colon. They thought that the symptoms might be explained by the rapid passage of the food, which did not allow time for absorption. They, therefore, gave tincture of opium to slow peristalsis. There was a tremendous improvement in the absorption of all the food elements, and the salts in the urine doubled. Atropine did not give as good results, but they think that the dosage may not have been correct. On the basis of their experiments on 2 cases, they conclude that the symptom-complex, known as coeliac disease, is to be attributed to a vegetative neurosis, which is only one manifestation of a universal, constitutional weakness of the nervous system. They, therefore, recommend an intermittent opium cure to carry children over severe, threatening periods. Fanconi also found that in severe cases peristalsis is increased, but that it is incomplete and partly without result. The fluid intestinal contents are well mixed and pass quickly to the lower end of the small intestine. They, however, do not carry the contents on. The upper bowel, therefore, continues full. This is proved by the fact that barium and charcoal remained freely distributed through the intestinal contents for two or three days. He says that with such stasis, tincture of opium can do no good. His results do not disprove, of course, the possibility of a vegetative neurosis as the cause of the trouble. Freise and Jahr's arguments are, however, not very convincing. If the cause is a "vegetative neurosis", it is difficult to understand why children should improve on a protein diet. It seems likely that this explanation, as in many other instances, is simply a cloak for ignorance.

This symptom-complex has been attributed, of course, as everything is sooner or later, to a "dysfunction" of the endocrine glands. Since no one knows what these glands, with a few exceptions, do or do not do to the system as a whole, or to each other, it is very easy to lay any symptoms at their door. It is equally hard either to prove or disprove any claims or statements which are made regarding them. As far as I am able to find, there is no convincing clinical or experimental evidence either on one side or the other,—merely assumptions, guesses and conjectures. MacLean and Sullivan note that some symptoms are common to Addison's disease and "coeliac disease" and that there is an increased tolerance to dextrose in both. The flat sugar curve in this symptom-complex is probably due, however, to impaired or delayed absorption. It seems idle to consider disturbance of the parathyroids as having anything to do with the etiology because "tetany" sometimes develops in the course of this disease. There is every reason why it should, when more Ca is being eliminated than absorbed. Fanconi states that few or no histologic alterations have been found *postmortem* in the organs of internal secretion and that they are nearly of normal size. Lehndorff and Mautner, in their summary of the literature in 1927, say that there is nothing to show that the slight changes found in these organs are not due simply to malnutrition.

In this day and generation, when one cannot open a newspaper or lay magazine or turn on the radio without seeing or hearing something about the vitamins, it was impossible that this symptom-complex should not be supposed by some to be the result of an avitaminosis. No convincing evidence has been presented, however, that a lack of vitamins is the cause, and no single vitamin has been selected as the one lacking. With the exception of cessation in growth, this symptom-complex shows no symptom in common with those due to a deficiency of vitamin *A*. Block, moreover, has treated three children with injections of *A* without benefit. Haas has called attention to the similarity of some of the symptoms of severe cases of this complex to those of beriberi. He claims that the pathology of the two conditions is the same, but admits that degeneration of the nerves has not been demonstrated in this symptom-complex. He does not believe that these diseases are the same, however, and thinks that the symptoms of beriberi are due to the inability of the organism to utilize carbohydrates, the chief carriers of *B*. The lack of appetite has been attributed to a deficiency of *B*. It is far more likely to be due to gastric and intestinal stasis, as emphasized by Fanconi. The connection between anorexia and a deficiency of *B* is, moreover, far from proven. It has been suggested that the supposed favorable action of bananas in the treatment of this condition is due to their content in vitamins, especially of *C*. This symptom-complex develops, however, in children

taking orange juice and is not cured by orange juice, which contains far more *C* than bananas. So far as I know, no one has suspected a lack of *D*, although Parsons has shown that *D* will cure the rickets which develops in late cases. It has no effect on the osteoporotic changes in the bones, which are so marked until improvement begins. It seems safe to conclude, therefore, that this symptom-complex is not due to an avitaminosis. If there are symptoms which point to, and probably are due to, a deficiency of vitamins, this deficiency is the result of imperfect absorption of foods carrying the vitamins, this imperfect absorption being due to the underlying cause of the disease, whatever that may be.

It is generally agreed that there is an excessive loss of salts in the stools. Lehndorff and Mautner give a table of all the findings as to mineral metabolism up to 1927. The loss of Ca in the stools is often greater than the intake, resulting, of course, in a negative Ca balance. Coincidentally, the urine shows a great diminution in Ca. Brown, Courtney and MacLachlan think that this diminution is not entirely due to the loss of Ca in the feces because of McCrudden's case, in which the Ca content of the urine was the same whether there was Ca retention or not. Much more P is eliminated in the stools than normally. Fanconi gives figures showing that it is greater than the intake. Lehndorff and Mautner say, however, that the balance of Mg. and P is not negative unless the loss in the urine is also taken into account. Fanconi says that the loss of chlorides in the stools depends on the water content of the stools, not on the severity of the disease.

Fanconi lays great stress on the hypophosphatemia. He estimated the P in the blood in 15 cases. It was below normal most of the time in every case, and up to low normal only 9 times in 54 examinations. It was often very low without any evidences of florid rickets. He thinks that the low blood P explains the retardation in development, believing that P acts as an inorganic growth hormone. However this may be, there is no doubt that the retardation in growth in length is one of the most marked and a constant symptom of this condition.

Evidences of rickets are very unusual in these cases until improvement begins. Parsons says that the bones are unduly small, even allowing for the small stature of the child. The trabeculae may be well formed, but, if the disease has been present for some time, they appear to be thinner and the whole bone more osteoporotic and fragile than normal. The cortex is thinner than would be expected, but the epiphyseal line is quite sharp and distinct. Fanconi's description agrees with his. Parsons believes that the lack of changes is due to lack of growth; for example, there is no rickets in infantile atrophy. Defective absorption causes starvation and lack of growth. The absorption of Ca and P, although greatly diminished, is sufficient to calcify the fragile bones as long as there is no growth. With improvement and growth, true rickets may develop. This rickets, like rickets from any other cause, can be cured by ultraviolet light irradiation or irradiated cholesterol.

Various authors have called attention to spasmophilia in connection with this symptom-complex. That it should develop is not surprising and hardly deserves comment, when the low blood Ca is taken into consideration. Parsons thinks that whether it develops or not depends on whether the Ca is ionized or not. He calls ionized Ca, "free calcium", and unionized, "bound calcium". In 2 cases of "coeliac disease" with manifestations of spasmophilia, he found the free calcium low and in 2 others without such manifestations, it was not diminished.

Certain symptoms in this symptom-complex are perhaps worthy of special consideration. The large abdomen is of special interest. According to Fanconi, the intestines are of normal length, but often much distended. The length corresponds to the body length, not to the age. The mesentery is of normal length. The muscles of the intestines are well developed. They, like the abdominal muscles, are, however, hypotonic. The chief cause of the large abdomen is the large amount of fluid in the intestines. Hence, the constant decrease in size after the passage of enormous stools. The size of the abdomen and the severity of the illness are not necessarily parallel.

Hydrolability is a constant symptom, according to Fanconi. It certainly is an important one and one for which sufficient allowance is often not made. The daily variations in weight are due to the large stools and to the faulty storage of water, dependent on the disturbances of mineral metabolism. The kidneys cannot function properly when so much water is lost in the stools. It is said that their concentrating power for salt is also lost.

Hypotonia is another symptom often not given enough consideration in treatment. This, according to Fanconi, is due to demineralization, especially to an insufficiency of P. This may be so, but an equally reasonable explanation is that it is simply one of the manifestations of general malnutrition. Fanconi sums up the blood findings very well, as follows: "All coeliac patients are pale. Nevertheless, in many of them the hemoglobin and number of red cells is not diminished. The red cells may be increased because of concentration of the blood. Leukopenia is often present. Both neutrophiles and lymphocytes are involved. Leukopenia and anemia are both signs of a diminished capability of the bone marrow. The eosinophiles are usually decreased, but not always. The monocytes may be increased."

Nothing new has appeared as to diagnosis and prognosis. Everyone agrees that this is a very serious condition, that many die of it, that re-

lapses are frequent, and that recovery is very slow. No one, however, seems to appreciate that there may be, and almost certainly are, all degrees of this condition and that the prognosis in the mild and moderate cases, which are not recognized, and hence not called "coeliac disease", is good.

Everyone gives the stock diagnostic differences between this symptom-complex and megacolon and tuberculous peritonitis. Much confusion exists as to the diagnosis between "coeliac disease" and indigestion, as is well shown by the terms used—coeliac disease, intestinal infantilism, coeliac infantilism, chronic intestinal indigestion in children, chronic intestinal indigestion, intestinal infantilism and similar forms of chronic disturbances of digestion. Some use the terms "coeliac disease" and "intestinal indigestion" synonymously; others, "coeliac disease" and "intestinal infantilism". Others apparently hedge, as Miller seems to do in his definition in 1926, where he says,—"Coeliac disease is a digestive disorder arising in infants and young children who show no evidence of chronic intestinal or other organic abdominal disease; . . . ." Perhaps agreement would be reached more easily if everyone meant the same thing by "indigestion". Some, apparently, limit the term to a disturbance of the normal processes of digestion without disturbances of absorption and others include disturbances of the absorptive powers of the digestive tract with the consequent disturbances of metabolism. It seems impossible to me to separate them in this way and more reasonable to include disturbances in absorption under the term "indigestion". How conflicting the evidence is, and how difficult it is to arrive at any positive conclusions, have been shown in the preceding analysis of the literature. My own opinion is that it is wiser to look upon this symptom-complex as a manifestation of a serious impairment of the digestive and absorptive powers for fat and carbohydrates, especially starch, differing only in degree from everyday, minor disturbances, and to think of it as a severe type of chronic indigestion. To my mind it is a mistake to give it a special name. There is certainly nothing pathognomonic about the anatomical changes found in the digestive tract. The changes found in other organs are those commonly found as the result of disturbance of the nutrition from any cause. The most characteristic symptom, failure to gain in length, is seen in other disturbances of nutrition, although to a much slighter degree. It will be time to give this symptom-complex a name when a specific etiology and pathology is established for it.

It is evident that there is no specific treatment for this condition. It has already been shown that the evidence is against the need for, or value of, the various digestive ferments and the bile salts. On account of the diminution or lack of HCl in the gastric secretions, it would seem rational to give it. Taylor, however, reports no benefit from it. Fanconi, with his peculiar ideas as to the shifting of the metabolism to the acid side, advises against it and other acids. The addition of some form of acid, usually lactic, to the milk is recommended by most writers, presumably because they believe that it makes the digestion of the casein of the milk easier. This is not the place to discuss the use of acids in infant feeding. There is, however, no apparent objection to such an addition for this purpose in this condition.

All agree that the treatment is by regulation of the diet. All agree that fats must be eliminated. Those who see only the type in which the intolerance for fat is the marked symptom, do not appreciate the importance of limiting the carbohydrates. Those who see the type in which the intolerance for carbohydrates is the most prominent symptom, understand that they also, especially starch, must be eliminated as far as possible. Few seem to appreciate nowadays the importance of frequent examinations of the stools in the regulation of the diet. All agree that a certain amount of carbohydrates must be given in order to prevent acid intoxication, and as much as possible in order to push up the caloric intake. The form in which it is most often given is Karo corn syrup. Few of those who use it, however, know what is in it. They give it because it is highly recommended and well advertised. It does contain, of course, a certain amount of dextrose, as well as the dextrins and maltose, and is, therefore, more readily absorbable than milk sugar and cane sugar. It differs very little in its composition, however, from the dry dextrins-maltose preparations and is, therefore, no better. Herter recommended milk sugar. Theoretically, levulose would be the preferable sugar, as, experimentally, it is better utilized than the others. All agree that the basis of the diet must be proteins. The proteins of milk are generally preferred. The stock method of giving milk has been in the form of protein milk, regardless of the fat content of this preparation. It would seem better to give preparations of milk which do not contain fat. Everyone believes in "curds" or cottage cheese. Other proteins are also used, animal being preferable to vegetable.

In 1924 Haas recommended bananas in the treatment of "coeliac disease". Since then, with 1 or 2 exceptions, the articles on this subject in American medical literature have read like advertisements of the United Fruit Company. He said that carbohydrates should be excluded from the diet, except as they occur in milk products with "one exception, that is, sucrose, as it occurs in the extremely ripe banana. This is tolerated perfectly". ("Sucrose" is synonymous with sugar and does not mean any special form of sugar.) "Banana is not only well tolerated, but rapidly changes the entire picture of the disease to one of well being." He states that "an

unripe banana is a starch and an overripe banana is a sucrose with an invert sugar". ("Invert sugar" is a mixture of dextrose and levulose.) He reported 10 cases, eight of which made a clinical recovery and two died. He advocated giving as many bananas as a child would take. One, aged 2 years, took sixteen a day. He does not give the analysis of bananas, but emphasizes the importance of high calories in treatment. He does not mention vitamins, but says, "Whether there is a factor in the banana, other than the carbohydrate content, which results in this cure is unknown." Pease and Rose had recommended bananas as a food for children in 1917. Their experiments show that the carbohydrate of baked and ripe bananas was almost entirely utilized. They say that the carbohydrates "in the green fruit are in the form of a starch, but on maturing this is converted first into sucrose and finally into invert sugar". This statement does not seem to be chemically correct. The end product of the breaking down of starch is dextrose. If invert sugar is present, the levulose must come from saccharose, which they do not mention. The probable explanation is, provided their statement as to invert sugar is correct, that bananas contain both starch and saccharose. There seems no reason to believe, however, that dextrins and dextrose formed from starch in bananas are any more absorbable and utilizable than the same sugars in the various dextrins-maltose mixtures. It may be that the levulose, which is not present in the other mixtures, is. MacLean and Sullivan, in their study of blood sugar curves after the ingestion of various sugars, found that after the ingestion of equal parts of fructose (levulose) and dextrose blood sugar curves were obtained in children with "coeliac disease" similar to those of normal children after the ingestion of dextrose. This suggested to them a possible explanation for the coeliac patient's tolerance of bananas. Nelson thinks that the availability of the sugar is due, in part at least, to the softness of the cellulose of the banana. It would seem reasonable to believe that the same sugar without any cellulose would be even more valuable. Nelson found that starch was always present in bananas, even when they were black on the outside and beginning to deteriorate. He states that if the efficacy of bananas was due to an enzyme, there would be more in raw than in cooked bananas. His experiments show, however, that the dried feces were greater on raw than on cooked bananas, showing that, if there were any enzymes present, they were worthless. Pineapple juice, moreover, contains similar enzymes. It is no more efficient in this condition than orange juice, which has no enzyme. Bananas contain vitamins *A*, *B*, and *C*. As there is no evidence that this symptom-complex is due to a lack of vitamins, this fact can be of no importance. Roughly, a banana weighs 100 grams and contains 100 calories. It contains but 1 or 2 grams of protein, 22 of carbohydrates, and 1 of fat, .009 mg. of Ca_2O, and .03 of P_2O_5. There is no reason, therefore, for believing that bananas have any specific action in the treatment of this condition. They apparently simply afford a fairly safe and convenient method of giving carbohydrates.

Fanconi has evolved a very peculiar diet, that is, one high in bases—fruit and green vegetables—and low in acid equivalents—meat, fat, eggs and starch. He thinks cane sugar and starchy foods cause fermentation and excludes them. After a time he adds nuts and gradually milk proteins, liver and meat. He claims good results with this régime. I should hate to try it.

Other methods of treatment which are recommended by various authors are undoubtedly useful: an occasional starvation day, if there is gastric or intestinal stasis; as high a caloric intake as possible; keeping the colon empty; avoidance of fatigue; finally, general care of the body and of the mind.

REFERENCES

1 Bauer, E. L.: American Journal Diseases of Children 35, 414, 1928.
2 Bloch, C. E.: Acta paediat. 7, 207, 1928.
3 Bramwell, B.: Edinburgh M. J. N. S. 14, 323, 1915.
4 Brown, A., Courtney, A. M., Davis, G. A. & MacLachlan, I. F.: Am. J. Dis. Child. 30, 603, 1925.
5 Brown, A., Courtney, A. M. & MacLachlan, I. F.: Brit. J. Dis. Child. 19, 113, 1922.
6 Cautley, E.: Arch. Pediat. 38, 163, 1921.
7 Freeman, R. G.: Am. J. Dis. Child. 2, 332, 1911.
8 Freise, R. & Jahr, J. M.: Jahrb. f. Kind. 110, 205, 1925.
9 Haas, S. V.: Am. J. Dis. Child. 28, 421, 1924.
Arch. Pediat. 46: 467, 1929.
10 Herter, C. A.: Infantilism from Chronic Intestinal Infection. The Macmillan Co., N. Y., 1908.
11 Hill, E. & Bloor, W. R.: J. Biol. Chem. 53, 171, 1922.
12 Howland, J.: Tr. Am. Pediat. Soc. 33, 11, 1921.
13 Jensen, I.: Acta paediat. 9, 405, 1930.
14 Kugelmass: Clinical Nutrition. J. P. Lippincott Co., 1930.
15 Lehndorff, H. & Mautner, H.: Ergebn. d. inn. Med. u. Kinderh. 31: 456, 1927.
16 MacLean, A. B. & Sullivan, R. C.: Am. J. Dis. Child. 38: 16, 1929.
17 Marriott, W. McK.: Tr. Am. Pediat. Soc. 34, 39, 1922.
18 Miller, R.: Lancet I: 743, 1921.
Lancet I: 72, 1923.
Lancet I: 330, 1926.
19 Moncrieff, A. & Payne, W. W.: Arch. Dis. Childhood 3: 257, 1928.
20 Neale, A. V. & Klumpp, T. G.: J. Clin. Invest. 9, 197, 1930.
21 Nelson, M. V.: Am. J. Dis. Child. 39: 76, 1930.
22 Parsons, L. G.: Arch. Dis. Childhood 2, 198, 1927.
23 Pease, M. C., Jr. & Rose, A. R.: Am. J. Dis. Child. 14, 379, 1917.
24 Poynton, F. J. & Cole, L. B.: Brit. J. Dis. Child. 22, 30, 1925.
25 Sauer, L. W.: Am. J. Dis. Child. 29, 155, 1925.
26 Schaap, L.: Arch. d. mal. de l'appar. dig. 16, 914, 1926.
27 Sperry, W. M. & Bloor, W. R.: J. Biol. Chem. 60, 261, 1924.
28 Still, G. F.: Lancet 2: 163, 193, 227, 1918.
29 Sylvester, P. H.: Boston M. & S. J. 183, 254, 1920.
30 Svensgaard, E.: Acta paediat. 9: 22, 1929.
31 Taylor, R.: Am. J. Dis. Child. 25, 46, 1923.
32 Fanconi, G.: Jahrb. f. Kindheilk. Supplement No. 21, 1928.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 17131

ACUTE RECURRENT MULTIPLE ARTHRITIS

MEDICAL DEPARTMENT

First admission. An Irish-American schoolgirl fifteen years old entered the hospital ten years before her final admission.

She had had dyspnea for a year. Her sleep was disturbed because of attacks of difficulty in breathing with cough and yellow sputum at night. She had had sharp precordial pain three times in the past four days, once before getting up in the morning.

Examination showed the nose partially obstructed on both sides, tonsillar snags on both sides, a few small glands in the cervical, axillary and inguinal regions. There was a soft systolic murmur at the pulmonic area.

X-rays of the teeth and sinuses were negative. The chest showed thickening of the larger lung markings and questionable dilatation of the ascending bronchi.

A diagnosis of horsehair asthma was made.

Second admission. Three years later, when a pupil nurse, nearly seven years before her final admission, she reëntered the wards.

All her life she had had frequent severe sore throats keeping her in bed for several days at a time. Six months before admission she had a severe attack which made her lose three weeks' time, and two months before admission another equally severe attack. She had had two operations for removal of tonsils.

Her family history is not significant.

She gave a past history of the minor diseases of childhood but no severe illnesses.

Clinical examination was negative except that the aortic second sound was greater than the pulmonic second sound, the throat slightly reddened and the tonsils buried, though of fair size and apparently active.

The urine was negative. The blood is not recorded.

The tonsils and adenoids were removed. The patient made an uneventful convalescence and was discharged in six days.

History of interval. Five years and a half after her discharge, after feeling tired and losing weight for two months, she was ill in bed six weeks with pleurisy with effusion. Following this Dr. Hawes had x-rays taken and told her her chest was normal. For a year before her readmission she had no cough or pain. Three months before her third admission she began having trouble with her feet. Three weeks before admission they became so sore that she went off duty. The following morning she awoke with a lame right arm. Three days later her left hand was swollen, painful and red. The following day her shoulders were lame. The symptoms continued to shift from the hands to the shoulders and knees. Ten days before readmission she was somewhat better and went back on duty for a few hours a day. Five days before readmission the left knee became so stiff and painful that she had to stop work. After this both knees and ankles were involved off and on.

She had felt well throughout and had had fever only on the first day, 99.6°. She had been taking 30 to 60 grains of aspirin a day and pyramidon once or twice.

Third admission, March 15, seven years after her last discharge.

Clinical examination showed a fairly well nourished young woman in no discomfort. There were a few tonsillar remnants in the left fossa. There were many glands one to three centimeters in diameter on both sides of the neck, in the left axilla and in both groins, firm, freely movable, not tender. The heart was not enlarged. There was a soft systolic murmur at the apex. The aortic second and pulmonic second sounds were equal. The lungs were normal. The abdomen was tense and difficult to palpate. Nothing abnormal was made out. The left shoulder and left elbow were slightly tender and painful on motion. The left wrist and finger joints were red, tender, warm, swollen and painful. The pupils and reflexes were normal.

The amount of urine was 33 to 82 ounces. The urine showed a specific gravity of 1.010 to 1.030, the slightest possible trace to a large trace of albumin at 3 of 4 examinations, leukocytes at 3, one specimen loaded with leukocytes, rare to very many red cells at 3, granular casts at 3, hyaline at one. A fifth specimen showed urobilin. Blood examination showed 5,400 to 2,700 leukocytes, 69 to 50 per cent polynuclears, hemoglobin 75 to 70 per cent, reds 4,040,000 to 4,110,000, slight achromia in 5 of 6 smears, variation in size and shape in the last two, platelets slightly diminished in two, clumped in a third.

The temperature the first week was normal except for one rise to 99.5°. From March 22 to April 1 it was 98° to 100.3°, afterwards 98° to 104.2°. The pulse was 70 to 130. The respirations were normal until April 7, then 18 to 40.

X-rays of the teeth and sinuses and a Graham test were negative. The hilus shadows and larger lung markings were a little prominent. The heart shadow seemed a little large, particularly across the auricles. There was no definite evidence of disease in the lungs.

The anaphylaxis consultant who had treated her for asthma reported slight skin reactions to lactalb and peanut.

The patient continued to have symptoms shifting from the wrists to the shoulders. March 20 there was fluid in the right knee. The throat became increasingly sore. By March 30 she had lost two pounds and a half on a diet without milk. Throat cultures March 31 and April 2 showed streptococcus viridans and other organisms. She was given Alpine lamp treatment. The following day she had an acute flare-up of throat and fever. Blood cultures April 5 and 8 showed no growth in six flasks. Serum agglutinations with bacillus abortus and bacillus melitensis were negative. April 9 there was erythema over the cheeks and nose. The throat became increasingly sore, bluish-red with bleeding spots but with no definite ulcerations. The glands behind the right sternomastoid were slightly tender. A blood culture April 11 showed bacillus subtilis. Another April 12 showed no growth. The night of April 11 she vomited small amounts of bile three times. Chest examination showed bronchial breathing, dullness and increased voice sounds at the left base. There was a dull pink macular rash on the arms as well as on the face. April 13 there was complete consolidation of the left lower lobe. The patient was more toxic. That day 500 cubic centimeters of blood was transfused and on April 15 500 more. April 16 the throat was not so red but very dry, not unlike the throat seen in pneumonia. The abdomen was moderately distended. There was no tenderness, and the spleen and liver were not felt. April 17 there was a very rapid change for the worse, mild delirium, more rapid and difficult respiration, elevated temperature, pulse of poorer quality and more trouble with distention. Examination of the lungs was unsatisfactory because of very noisy breathing, expiratory wheezing and tracheal râles. There was slight dullness at the right base, probably due to distention. There was nothing to suggest fluid at the left base. April 18 she remained unconscious during the day, breathing more slowly without grunt, twitching at times, reacting to any stimulus by moans and facial grimaces. The neck was quite stiff. There was questionable Kernig. The knee jerks were normal. There was no clonus. She reacted to Babinski in "mass" fashion.* There was no definite dorsiflexion. That night she died.

Clinical Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

Up to the time of her second discharge I should say we know no disease that ought to cause any pain such as she had, nothing to throw any light on what disease she may have had.

*Generalized flexion of the foot, toes and knees.

Dr. Hawes found no evidence of tuberculosis, which of course the pleurisy would make us fear.

Such attacks as she had during the three weeks before her third admission would certainly be called acute rheumatism in the absence of any other cause for joint trouble.

NOTES ON THE PHYSICAL EXAMINATION

Three centimeters is quite a large gland. One cannot have that merely from unknown causes. If those glands are as large as reported they are quite important.

I cannot make anything definite out of the urine or out of the blood except very slight secondary anemia. So far she seems to have acute rheumatism plus some glands which may be due to some acute infection.

The cultures and serum agglutination tests show that they are looking everywhere for possible causes for her fever.

I am wondering whether the erythema over the cheeks and nose might possibly be erysipelas. They do not speak of a sharp border or of any raised area. There is not enough given here to constitute erysipelas.

The bacillus subtilis in the blood culture does not mean anything, does it?

Dr. Tracy B. Mallory: No; contamination.

Dr. Cabot: The evidence of bile in the vomitus merely means hard vomiting but does not incriminate any organ.

The dull pink macular rash makes them wonder about scarlet fever undoubtedly. Scarlet fever is closely connected with streptococcus infections.

The complete consolidation of the left lower lobe makes us think of pneumonia.

The slight dullness at the right base I suppose means distention pushing up the liver and putting it where one would expect to have lung.

DIFFERENTIAL DIAGNOSIS

There are certain things we can be fairly certain about. In the first place there is, I imagine, a generalized streptococcus infection, in spite of the fact that nothing ever grew in the blood cultures. She starts out with multiple joint troubles. The skin lesions go very well with streptococcus infection. The symptoms suggesting meningitis might perfectly well be due to meningismus, that is irritation of the meninges. I see nothing to incriminate the heart. We have no evidence of bacterial endocarditis, nothing to suggest embolism and no evidence in the blood. I do not know anything better to say than streptococcus infection involving the joints and the blood, the lung, possibly the meninges.

A Student: Might not this be agranulocytosis?

Dr. Cabot: Why? We are not given any such idea from the accounts of the blood.

A Student: The white cell count was down to 2,700.

DR. CABOT: The only differential count I find shows increase of polynuclears.

A STUDENT: There were only 69 to 50 per cent polynuclears.

DR. CABOT: We have no right to have any polynuclears at all in the type of angina that you speak of.

A STUDENT: Might she have a thrombosis of the internal jugular?

DR. CABOT: We are not told anything about the jugular.

A STUDENT: Was a pelvic examination done? Might there be a possibility of gonorrhea?

DR. CABOT: Generalized gonorrheal infection is a very rare disease. I do not remember hearing of a pneumonia from it. There generally is some lesion quite clear in the heart.

A STUDENT: But she had a great deal of trouble in the joints when she was not running any temperature. Doesn't that suggest atrophic arthritis?

DR. CABOT: I should not say so, because atrophic arthritis is something that runs a chronic course and I do not understand that is the case with her. Unless there were x-rays of the joints to back it up I should not consider that.

MISS PAINTER: There is no pelvic examination recorded.

A STUDENT: Do you think that these joints were septic rather than rheumatic?

DR. CABOT: No, I think they were rheumatic. I do not believe they were pus joints.

A STUDENT: Isn't it possible for that urine picture to be bacteremia with subacute nephritis?

DR. CABOT: I do not see any ground for supposing anything more than possibly an infection in the kidney. It is not nephritis in any other sense.

A STUDENT: What type of pathologic process do you have in mind when you say acute rheumatism?

DR. CABOT: I mean multiple joint inflammation without pus, shifting from joint to joint so that if it stops, as it usually does, the joints are left perfectly sound, as before. It is an infectious process the cause of which has not been fully identified, but it is generally believed to be of the streptococcus group. We distinguish it from atrophic arthritis and from hypertrophic arthritis, which is important much later in life, as well as from a gonorrheal arthritis or an arthritis due to any other known organism.

A STUDENT: Do you mean rheumatic fever?

DR. CABOT: Yes. What I am talking about is rheumatic fever or acute rheumatism. What is the present fashion about the bacteriology in acute rheumatism, Dr. Mallory?

DR. MALLORY: A growing number of people are finding positive streptococcus blood cultures in acute rheumatic fever. We have had several positive results in our own hospital. Cecil, in New York, has been able to get similar results in a high percentage of cases of chronic infectious arthritis, but few others have been successful in that.

A STUDENT: Bleeding spots in the throat are mentioned. Might those be embolic?

DR. CABOT: I have never heard of such phenomena that proved to be embolic. I should suppose they were evidence of sepsis.

BACTERIOLOGIC REPORTS

Throat cultures April 8 and 11 showed staphylococcus aureus.

Blood cultures April 13 and 14 showed staphylococcus aureus.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Acute infectious arthritis.
Lobar pneumonia.
Staphylococcus aureus septicemia.

DR. RICHARD C. CABOT'S DIAGNOSIS

Septicemia, streptococcus, involving the joints, the blood, the lungs, possibly the meninges.

ANATOMIC DIAGNOSES

1. *Primary fatal disease.*

   Septicemia.

2. *Secondary or terminal lesions.*

   Bronchopneumonia, upper lobe of right lung.
   Collapse of lower lobe of right lung.
   Hydrothorax.

3. *Historical landmarks.*

   Chronic glomerular nephritis.

PATHOLOGIC DISCUSSION

DR. MALLORY: There is not much to say about this case. The autopsy was essentially negative except for the positive blood culture, the pleural cavities, and the lungs. Although the organism found in the blood culture was first reported as a staphylococcus, further study, including animal inoculation, convinced us that it was really a hemolytic streptococcus. She had a very slight bronchopneumonia in the right upper lobe but also 1800 cubic centimeters of fluid in the right pleural cavity. I have still a very vivid recollection of a case in which I made a diagnosis of lobar pneumonia upon all the classical signs of solidification, and then of drawing off two liters of fluid the next morning at the suggestion of the visiting man. I think the signs were due to fluid rather than to the very slight area of solidification. There were 600 cubic centimeters of fluid in the left chest. The lung on that side was negative. There was no endocarditis. All the other organs were grossly negative. We did not examine the joints. Microscopic examination shows an acute pneu-

monia which fits in very well with a streptococcic process. There was a great deal of hemorrhage, few leukocytes and little fibrin.

There was evidence of a slight degree of glomerular nephritis. It looks like an old process, not a recent one. Everything else was negative.

Blood cultures showed hemolytic streptococcus.

A STUDENT: Dr. Mallory, did you not find even some slight endocarditis? I thought that in acute rheumatic fever one would expect some demonstrable endocarditis in practically all cases.

DR. MALLORY: We found none at all, though we were looking for it carefully. There are two types of arthritis in which streptococci are implicated, one typical rheumatic fever and the other a syndrome usually known as chronic infectious arthritis. Cecil has worked very extensively on that in New York during this past year, and has been able to demonstrate streptococci of a definite strain in the blood stream of a considerable percentage of his cases. No one else has been able to do it with such regularity. He is able to differentiate accurately by agglutination reactions between rheumatic fever and infectious arthritis. The latter disease is, however, recognized only as a chronic, non-fatal disease. Whether it may have an acute and possibly fatal form is not known.

DR. CABOT: But you do not have to have endocarditis, do you?

DR. MALLORY: That is one of the differences between the two diseases.

CASE 17132

ANEMIA, HYPERTENSION AND LOSS OF WEIGHT

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. EARLE M. CHAPMAN*: This is the history of a twenty-nine year old married American housewife who entered the hospital on January 6 complaining of headaches.

At the age of fifteen she had scarlet fever; following that no known complication. Since that time she had been perfectly well apparently. She had been married four years, living with her husband. For the past year and a half she had been bothered with severe occipital headaches which were worse when she became pregnant for the first time ten months before entry. After three months her doctor told her that she had high blood pressure and albuminuria, and advised termination of the pregnancy. This was done, and at the same time she was put on a salt free and red meat free diet. She felt well after this and resumed her housework and social activities. Her head cleared. She continued to feel well until three weeks before entry. At this time she contracted a common cold and cough that confined her to bed. She began to vomit almost everything she ate and the dull occipital headaches returned. In addition she had some palpitation and nocturia once or twice at night for the first time. Blurring of vision with black specks before the eyes now began. Her illness advanced rapidly. Lately she had been unable to retain food or fluids, so her doctor advised her coming in here for study. She had lost 23 pounds in the past seven months.

*Senior interne on the West Medical service.

At entry she presented a picture of a rather drowsy, coöperative and oriented girl, well developed and slightly undernourished. Her skin was dry and rough, without petechiae. Examination of the head showed a pale, rather puffy countenance. The fundi showed papilledema with marked retinal vascular degeneration with some exudate, venous engorgement and small hemorrhages. These changes were more marked in the right eye than in the left. Examination of the heart showed an increase in size to the left. The rate was rapid, the rhythm regular. The sounds were sharp, with a blowing systolic murmur loudest at the pulmonic area and a questionable presystolic sound at the apex. The blood pressure was 190 systolic, 115 diastolic at admission. The abdomen was negative except that the edge of the liver and the tip of the spleen were palpable. The cervix was retroflexed. The extremities were negative except for moderate pitting edema of the ankles and some slight bruises.

The laboratory examinations at that time showed a urine with a large trace of albumin, 10 to 20 white blood cells and an occasional red cell in a catheterized specimen. No casts were described. The specific gravity was never over 1.014. Examination of the blood showed a severe secondary anemia, 2,500,000 red cells, 50 per cent hemoglobin, white cell count 8,600. Stool examination showed a negative guaiac. The non-protein nitrogen at entry was 125 milligrams. The total protein done at entrance was 6.2 per cent. Later we checked up and believed that the total protein must have been done on whole blood, because the following day it was done on the plasma and was 5.5 per cent. The basal metabolic rate was minus 2, pulse 101, weight 38.9 kilograms. An electrocardiogram showed sino-auricular tachycardia, rate 130, right axis deviation, inverted T_1 and flat T_2. No renal function studies were done because the course was so rapidly downhill.

She became more and more lethargic. The non-protein nitrogen mounted to 195 milligrams. She showed uremic twitchings, though no definite convulsions. Morphia was given freely. She had a mild irregular febrile course until January 14, eight days after entry, when she died.

Clinical Discussion

Dr. Chester M. Jones: Did she have a pericardial friction rub?

Dr. Arlie V. Bock: There was none.

On her appearance alone one would have made a diagnosis of myxedema or chronic nephritis. On closer examination it was obvious that she was uremic. In addition to a severe secondary anemia her heart showed gallop rhythm, suggesting a terminal state. The chief thing to do for her seemed to be to prevent convulsions if we could by giving large doses of morphia. I think that the dosage of morphia used was the reason she did not have any convulsions in the ward.

The question of the type of nephritis we discussed, assuming that she started with glomerular nephritis; but we raised the question, in view of her blood pressure, eye signs and the absence of cells and casts in the urine, about the degree of arteriolar damage in the kidney, which I believed would be found to be extensive.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Chronic nephritis with edema.
Uremia.

ANATOMIC DIAGNOSES

Chronic glomerular nephritis.
Acute endocarditis.

Pathologic Discussion

Dr. Tracy B. Mallory: Dr. Bock's predictions are entirely correct. She showed an old extensive glomerular nephritis with very marked atrophy of a large proportion of the renal tissue. On the other hand the sections show practically no evidence of inflammatory activity in the glomeruli at the time of death. The most acute looking lesions that we found were all in the arterioles, and even those were not very acute. They were of the type that we usually call benign vascular nephritis such as we see in elderly hypertensives with a moderate amount of renal involvement. It is not the type of acutely progressive inflammatory process that we get in malignant hypertension. We were somewhat interested in the grade of anemia. Practically every case of nephritis as advanced as this one which we have had here in the last two years has shown as much anemia, rather irrespective of type. The cases of malignant vascular nephritis do seem to have shown anemia relatively early in the game, at a time when they still have a considerable amount of functioning renal substance left. The chronic glomerular cases do not usually show marked anemia until very far along. I think occasionally the anemia is of clinical value in serving to differentiate a chronic process from an acute process which has only become evident in the last few weeks of life. Often a few weeks of symptoms are all that the most careful history will elicit in a nephritis of years' duration. The finding of a very marked anemia might be of real diagnostic help in such cases. One case in point came to autopsy with a clinical diagnosis simply of hypertensive disease. He had a hemoglobin of 40 and a red count of 2,000,000 that was entirely unexplained. We found a very advanced chronic vascular nephritis at autopsy.

Dr. Jones: Was there anything in the heart, Dr. Mallory?

Dr. Mallory: There was a very slight acute endocarditis, but I think it was merely a terminal affair. I do not believe it was of symptomalogical significance, nor do I believe we can attribute the anemia to it.

An Interne: Was anything found to account for the right axis deviation?

Dr. Mallory: We found nothing to explain that.

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THE BAKER FOUNDATION

IF the dinner given March 12 at the Copley-Plaza Hotel in behalf of the Baker Foundation is any criterion of public interest, there should be no question of the success of the drive for its future development. The attendance was large and representative and there can be no doubt that the speakers felt the urgency of the cause and the necessity for action if the work which the Foundation represents is to continue and grow. It may fairly be said that there are few enterprises of a public nature about which so little is generally known. Since the pioneer efforts of Judge Baker, which eventuated in the Foundation in his memory, the work has gone forward for the past thirteen years with increasing momentum in spite of small monetary support, under the unselfish leadership of Judge Frederick P. Cabot and Dr. William Healey. It was surprising to hear from Governor Ely that up to several months ago he had not been aware of the existence of the Baker Foundation in spite of his active concern in the courts with delinquency. The public at large has doubtless been equally ignorant of the scope and meaning of the attempt to attack the problem of crime at its source. In the past decade an almost revolutionary change has come regarding the significance of criminality, its origin and development, as part of the new point of view concerning mental disease in general. The "born criminal" is gradually disappearing from the stage; the dogma of inherited defect is giving place to a more rational conception of postnatal developmental factors, and the problem of the "individual delinquent", in Healey's happy phraseology, is emerging. Otherwise stated, the time has come for the detailed study of the antisocial person in all his human relations uninfluenced either by sentimentality or adherence to the too easy explanation of hereditary transmission. The full import of the new point of view is obviously unrecognized as yet by the general public. It is therefore most fitting that at this time attention should be drawn to the needs of the Baker Foundation, which stands in the forefront of the attempt to study the problem in the thorough-going way which alone offers hope of its ultimate solution. This need was emphasized in no uncertain terms by Judge Cabot, Governor Ely and the Honorable George W. Wickersham, who from somewhat different angles pointed out the social, political and practical necessity of facing the facts and supporting a movement which from its inception, first in Chicago and then in Boston, has spread into every quarter of the world. The first step toward the further development of the movement, so auspiciously begun, is to inform physicians and the public at large as to its meaning and significance and to bespeak their assistance in spreading the gospel either by word-of-mouth or in more material ways. Such a meeting as the recent inaugural dinner, should at least be an entering wedge toward this end.

NATIONAL CHILD HEALTH DAY

MAY Day, starting as an out-door play day, has become a health day under the auspices of the American Child Health Association. On that date, states, cities and villages begin and end their annual plans for the children of their communities.

The White House Conference Committee on Recreation and Physical Education, according to a recent release of the Child Health Association, points out that "the efficiency of the program of recreation and physical education diminishes as you follow it back from its application to the youth of 18 years to the infant". This efficiency, better in the secondary school than in the elementary school, disappears when we reach the preschool child.

Despite the ultra-modern belief in the value of free play and respecting the needs of the individual rather than those of the group, the Committee on Recreation and Physical Education states that the child must be guided in

play. Many children need adult stimulation of their imaginations, not to make them dependent but to give them a start in developing their own interests and activities. To this end suitable play materials must be provided—suitable to the individual and to his age, in order that motor skills may be developed and mind and body coördinated.

This is the present-day significance of May Day. It is the child's own day, and at no time compared to the present has the child received so much respect, so much solicitude, so much inquiring into the nature of his wants and his needs. We have come in truth to recognize him as the father of the man—the foundation on which the nation's future welfare is based. In all this tender solicitude, however, we must learn to respect his solitude. We must remember the words of Emerson and be not too much the parent.

WHAT IS THE VALUE OF AN ENDORSEMENT BY DOCTORS

THE manufacturers of a brand of cigarettes have been carrying an advertisement in daily papers in which claims for superior qualities are endorsed by a group of alleged specialists.

This sale of so-called medical opinion to promote the popularity of cigarettes is, we believe, degrading to medicine. It is hardly supposable that these doctors gave this opinion without a quid pro quo. It would be of interest if the names of these men could be known.

Perhaps they felt that, if a man in high repute in organized medicine could be induced to lend his name to help a soap manufacturer, cigarettes are also worthy of medical endorsement. We suspect that the manufacturers and the "specialists" will not divulge the names of the men comprising this group. Perhaps some of the doctors who may have seen the advertisement will recognize the faces of their associates as they appear gazing intently at the exhibition of the manufacturer's product in poses almost suggesting the interest of Dr. Tulp's pupils in the anatomical demonstration by Rembrandt and if so it might be well for the rest of the profession to know those who are the few chosen by the cigarette manufacturers and on whom the title of "specialist" is fittingly bestowed.

Then again the question comes to mind—did these men respond to the appeal for endorsement on the receipt of the gift of a few cigarettes or were they paid the princely fee demanded by some specialists, or did they split fees with the medical go-between?

Another cigarette manufacturing company once claimed to get the endorsement of a large number of doctors after the free gift of a few cartons of its product and we are moved to wonder whether the medical profession is becoming the easy mark of various commercial enterprises.

We hold that if it is possible to get the names of these endorsers of cigarettes that they ought to be smoked out of their anonymity.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

NELSON, N. A. B.S., M.D. Long Island College Hospital, Brooklyn, New York 1926. Epidemiologist in Charge of Venereal Disease Control, Massachusetts Department of Public Health. Assistant Physician, Department of Dermatology and Syphilology and Junior Assistant Surgeon, Department of Gynecology, Boston Dispensary. Acting Assistant Surgeon, United States Public Health Service. Address: 546 State House, Boston. Associated with him is:

SCAMMAN, CLARENCE L. A.B., M.D. Bowdoin 1912. Director of Division of Communicable Diseases, Massachusetts Department of Public Health. Address: 546 State House, Boston. Their subject is: "Gonorrhea and Syphilis in Massachusetts in 1930." Page 637.

O'BRIEN, FREDERICK W. A.B., M.D. Tufts College Medical School 1911. Professor of Radiology, Tufts College Medical School. Visiting Roentgenologist, Cambridge City Hospital, Boston Sanatorium and Boston City Hospital. His subject is: "Kümmell's Disease." Page 641. Address: 465 Beacon Street, Boston.

HYMAN, ALBERT S. A.B., M.D. Harvard University Medical School 1918. F.A.C.P. Cardiologist and Associate Attending Physician, Beth David Hospital. Cardiologist and Attending Physician, Geriatric Hospital of The Home of the Daughters of Jacob. Consulting Cardiologist, Harlem Day and Night Nursery. Chief, Cardiac Clinics, Beth David Dispensary. Director, Witkin Foundation for the Study and Prevention of Heart Disease, New York. Address: 1235 Park Avenue, New York City. Associated with him is:

PARSONNET, AARON E. M.D., C.M., Loyola Medical College 1913. F.A.C.P. Cardiologist and Attending Physician, Chief of Cardiac Clinics, Beth Israel Hospital, Newark, New Jersey. Fellow, Witkin Foundation for the Study and Prevention of Heart Disease, New York. Address: 3 Madison Avenue, Newark, New Jersey. Their subject is: "Myocardosis—The Failing Heart of Middle Life. II. Early Clinical Manifestations." Page 648.

ROWLAND, WILLIAM D. M.D. University of Michigan Homeopathic Medical School 1911. F.A.C.S. Professor of Ophthalmology, Boston University Medical School. Chief of Ophthalmic Service, Massachusetts Memorial Hospitals. His subject is: "Glaucoma." Page 653. Address: 220 Clarendon Street, Boston.

COUES, WILLIAM PEARCE. M.D. Harvard University Medical School 1894. F.A.C.S. Sur-

geon to Out-Patients, Massachusetts General Hospital. Consulting Surgeon, Massachusetts Eye and Ear Infirmary. Instructor in Surgery, Tufts College Medical School. His subject is: "A Case of Teratoma of the Breast." Page 656. Address: 12 Monmouth Court, Brookline, Mass.

SNOW, FRANK WHIPPLE. M.D. Harvard University Medical School 1902. Attending Physician, Anna Jaques Hospital. His subject is: "The History of Medicine at the Mouth of the Merrimack River, Newburyport, in Relation to the Essex North District Medical Society." Page 658. Address: 24 Essex Street, Newburyport, Mass.

ANTHONY, FRANCIS W. A.B., M.D. Harvard University Medical School 1888. Medical Examiner for Essex County, 4th District. Consultant to S. H. Gale Hospital, Haverhill, Mass. His subject is: "History of the Practice of Medicine in Haverhill and Vicinity Since 1836—Based on the Recollections of Fifty Years and the Records of 100 Years." Page 661. Address: 81 Merrimack Street, Haverhill, Mass.

BURNHAM, J. FORREST. M.D. Harvard University Medical School 1901. Secretary, Essex North District Medical Society 1907-1930. Member, Medical Staff of Lawrence General Hospital from 1903. His subject is: "The Story of Essex North District Medical Society in Lawrence, Methuen, Andover and North Andover from 1841 to 1930." Page 665. Address: 567 Haverhill Street, Lawrence, Mass.

MORSE, JOHN LOVETT. A.M., M.D. Harvard University Medical School 1891. F.A.A.P. Professor of Pediatrics Emeritus, Harvard Medical School. Consulting Physician at Children's Hospital, Infants' Hospital and Beth Israel Hospital. Member, New England Pediatric Society, American Pediatric Society, Association of American Physicians and Boston Obstetrical Society. His subject is: "Progress in Pediatrics." Page 668. Address: 319 Longwood Avenue, Boston.

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GIROLAMO FRACASTORO
1478-1553

IT is difficult to put ourselves back four hundred years and realize what intellectually turbulent times those must have been, times when men were reaching out after knowledge which the invention of the printing press was just beginning to liberate. That which scholars had found out and had committed to parchment was locked up in monasteries and libraries where it was accessible to only a select few. A flood of light was being thrown across the mental pathways of those in that period who had a capacity for thought and many a new idea was nurtured, later to take form as a permanent contribution to the progress of civilization. It is interesting to see how the concept of contagion was being fostered at the very moment, and in the very minds, of those who still believed, unreservedly, in the occult influence of planetary conjunction upon the affairs of men. A period of two hundred years was just elapsing during which Saturn and Mars had diverged to the utmost and were due to assume the points in their orbits where they most nearly approach each other. That there was an influence exerted by such conjunctions of the heavenly bodies upon the life of man was thoroughly believed and it was but natural that dread of some physical catastrophe should signalize the approaching approximation of these planets in November 1494. The much-heralded expectation seemingly did come true, when, shortly after Columbus' return from the new world, an epidemic of Syphilis broke out in many parts of Europe.

Fracastoro, an astronomer and a poet, as well as a physician, set himself the task of accounting for the advent of the disease in Europe, its nature, its clinical course and the ways in which it should be treated, and particularly was he the first to emphasize for this purpose. mercurial inunctions. To him, furthermore, is to be credited the name by which the affection which he describes has been most widely known. All this was done in the form of a poem dedicated to an intimate friend, Cardinal Pietro Bembo, which was published in 1530, forty years after the outbreak of the epidemic. This poem was entitled, "Syphilis, sive Morbus Gallicus."

The family of the Fracastoria was a renowned one in Italy, and Verona, the birthplace of Girolamo Fracastoro, had already been celebrated in verse by Catullus, 1500 years before Fracastoro's time. Because of evident capacity for study, shown in early life, he was sent to Padua at a time when that city was enjoying a well-deserved fame as a "Nursery of the arts." Here he formed many attachments with brilliant scholars with whom he maintained lifelong associations. After serving with the Venetian forces in certain of the wars of the period he returned to practice his profession in his native place. It is said that he soon became a popular and successful physician and also that he was in a position to carry on his practice without asking any fees. He busied himself with astronomy, natural philosophy and poetry in his spare time and brought to light many drugs and simples through his investigation of the writings of the ancients. He spent most of

his life in Verona and it was here that he produced many of the works that have rendered him famous. Of these probably the most important is his de Contagione in which he makes a remarkable (for the time) contribution to the knowledge of contagion, relates signs and symptoms with an accuracy that enables identification of the disease he describes as typhus fever, and makes certain observations upon phthisis that show that he appreciated its contagiousness. The basis for such observations as he makes upon infection in his de Contagione was his opportunity for study of the spread of syphilis over Europe, of several epidemics of typhus and of outbreaks of the plague occurring in his long professional life. He describes three methods of contagion: (1) through direct contact from person to person; (2) contagion through an intermediate agency and (3) from a distance, through the air, as in the pestilential fevers. Up to his time the Hippocratic and Galenic conception of the cause of fevers had prevailed, viz.: that some corruption of the "humors" of the body took place from within. He cites a striking parallelism between contagion and fermentation in wine and points out that although certain poisons may resemble contagions in their effects, they differ in that the poisons do not produce in the individual affected a principle capable of acting upon another person. He had seen enough of phthisis to feel justified in emphasizing the fact that living with a phthisical person was a fruitful source of contagion and that infection was possible for a year or more after a consumptive had vacated an apartment. In regard to the treatment of this disease he had not gone ahead of Galen. The de Contagione was written (1546) some time after the poem, "Syphilis, sive Morbus Gallicus", and the best article in it is that upon syphilis. It is of interest to note that two, only, of the very many articles written in the 15th and 16th centuries on the subject of syphilis, have possessed enough vitality to keep them out of the musty collections of the forgotten. Both of these were written by poets, only one of whom, Fracastoro, was a physician. Ulrich von Hutten, said to be the greatest name in the Reformation, after Luther and Erasmus, was a victim of the disease and recounts, in a treatise on Guiacum (1514), the experiences of himself and his friends until relieved by the drug of that name. The Guiac tree figures prominently in a digression that Fracastoro permits himself in "Syphilis, sive Morbus Gallicus." The dedication of this poem of von Hutten's to the Bishop of Mayence and that of Fracastoro's to a Papal Secretary is less incongruous than it would seem, for at that time syphilis was not regarded as almost exclusively a venereal disease. Fracastoro's poem should be read whether one's interest is in the disease described or in the poetical vehicle which the author employed to present his facts. It is available in Latin, French or an English, prose translation in the Library. As a poet and a clinical observer of unusual ability he has given abundant evidence. As a scientist he took high rank in his day, since he was bold enough to question Ptolemy's doctrine of a geocentric universe and was the first to use the term "pole" with reference to the axis of the earth. Copernicus was a fellow student with Fracastoro at Padua and it is likely that his astronomical ideas may have been derived from such an association. He also was greatly interested in the problems concerning refraction of light and was possibly the first, certainly among the first, to employ a combination of lenses to aid vision.

At a period when it must have been difficult to keep aloof from political and religious controversies he managed to retire to a country villa where he quietly prosecuted his studies and enjoyed the affection and respect of his fellow countrymen. He died as a result of an apoplectic shock, at his home in Verona in 1553, at the age of seventy-one.

MASSACHUSETTS LEGISLATIVE NOTES

The House of Representatives has rejected the bill to require applicants for registration as nurses to be citizens of the United States.

The Committee which considered the bill which was designed to clarify the present law respecting the use of contraceptive methods as a health measure has given an adverse verdict.

MISCELLANY

MORTALITY RATES

Telegraphic returns from 81 cities with a total population of thirty-six million for the week ending February 28, indicate a mortality rate of 14.0 as against a rate of 14.1 for the corresponding week of last year. The highest rate (25.8) appears for Nashville, Tenn., and the lowest (8.3) for Waterbury, Conn. The highest infant mortality rate (14.9) appears for Somerville, Mass., and the lowest for Utica, N. Y., which reported no infant mortality.

The annual rate for 81 cities is 14.2 for the nine weeks of 1931, as against a rate of 13.4 for the corresponding weeks of 1930.

Telegraphic returns from 81 cities with a total population of thirty-six million for the week ending March 7, indicate a mortality rate of 13.8 as against a rate of 13.3 for the corresponding week of last year. The highest rate (25.7) appears for Trenton, N. J., and the lowest (7.9) for Akron, Ohio. The highest infant mortality rate (14.0) appears for Dayton, Ohio, and the lowest for Tacoma, Wash., and Yonkers, N. Y., which reported no infant mortality.

The annual rate for 81 cities is 14.2 for the ten weeks of 1931, as against a rate of 13.4 for the corresponding weeks of 1930.—*Department of Commerce.*

FREE! A MENTAL HYGIENE FIVE FOOT SHELF

A limited number of back issues of *Mental Hygiene*, quarterly journal of The National Committee for Mental Hygiene, beginning with Volume I, 1917, are available, without charge, to libraries, medical schools, hospitals, clinics and other eleemosynary and educational institutions. We cannot, like the publishers of the Harvard Classics, promise readers of *Mental Hygiene* a liberal education, but we can send them, if they wish, a five foot shelf, approximately, of periodical publications that will add considerably to their store of knowledge in a new field, as there are copies for nearly every number of the magazine previous to 1930. The only charge will be for packing and shipping. As this offer will stand for but a few weeks, applications should be made at once to H. Edmund Bullis, Executive Officer, The National Committee for Mental Hygiene, 370 Seventh Avenue, New York City. Orders should be sent for as complete sets as possible.

A MAGNIFICENT FEE

The report is current that Dr. G. W. Roberts has brought suit against Mr. Frank N. Hoffstot, President of the Pressed Steel Car Company, for $150,000 for medical services. Mr. Hoffstot has applied for a bill of particulars.

The doctor claims that he attended Mr. Hoffstot from August 3, 1929 to May 5, 1930, that he travelled abroad to confer with specialists, went to Florida repeatedly and called several times at the defendant's house.

The court ruled that the plaintiff need only give his diagnosis in answer to the request for a bill of particulars.

Accounts in the daily papers are to the effect that Mr. Hoffstot was one of four plaintiffs who brought action in 1928 to have allopathic physicians ousted from the Fifth Avenue Hospital, New York and to have homeopathic methods used there exclusively. Mr. Hoffstot has been a large contributor to the hospital.

Dr. Roberts has been referred to as a homeopathic physician.

Whatever Mr. Hoffstot may feel about homeopathy he evidently does not regard the fee charged as diluted to the nth degree and finds the financial dose disturbing to his peace of mind.

RECOGNITION OF DR. CARREL'S WORK ON CANCER

On March 28, 1931, the Dr. Sofie A. Nordhoff-Jung prize for 1930 will be conferred on Dr. Alexis Carrel of the Rockefeller Institute for his outstanding research work on the problems of cancer.

The award of the diploma and a check for $1,000 will be at ceremonies at Georgetown University.

Dr. W. Coleman Nevils will preside. Ambassador von Prittwitz of Germany will read the diploma.

Ambassador Claudel of France will also attend.

The commission which made the decision as to the proper recipient of the prize was headed by Dr. Ernst von Romberg, Professor of Medicine in the University of Munich, and included Dr. Max Borst and Dr. Albert Doederlein, both of the same University, and Dr. Ferdinand Sauerbruch of the University of Berlin.

Dr. Nordhoff-Jung is a native of Germany and has been prominent among the women physicians of Washington for more than forty years and was interested in cancer research in Munich in 1914. Her husband was a physician. She has established a prize to be awarded every two years.

METALLIZED MILK

Although milk has long been extolled as the perfect food, where a child may need added mineral substances it has been proposed to add iodine for example to the cow's diet by the employment of plants containing this element; one useful ingredient supplying this requirement in the food having been found in seaweed.

It has been possible to increase the amount of some vitamins by making specific changes in the cow's diet, but iodine seems to be the only mineral the addition of which will meet this especial deficiency.

Iron and phosphorus will have to be supplied directly to the patient probably, although experiments are being made in various places to determine how cow's milk may be modified in its metallic content in order to supply these metals.

THE EVENTUAL ELIMINATION OF TYPHOID FEVER AND DIPHTHERIA

Dr. Livingston Farrand concurs in the more or less general opinion that typhoid fever and diphtheria will within a comparatively few years take a very subordinate position among diseases calling for public health activities. Dr. Farrand is the President of Cornell University and Chairman of a special commission appointed by Governor Roosevelt to study health conditions in New York State.

These diseases can be practically eliminated as soon as the laity will generally adopt the saving measures of science.

THE EYE THE KEY TO HEALTH

The above statement is reported to have been made by a speaker before the convention of optometrists.

Ophthalmologists will undoubtedly agree that changes in the eye are often evidences of general disease.

Since the state has granted recognition to optometrists, we are glad to see evidences of appreciation of pathological changes in the eye.

Reports of several other addresses seem to show an appreciation of the importance of discovering and correcting abnormal eye conditions.

FOOD AND DRUG INSPECTION

By the appropriation of an additional grant to the Federal Food and Drug Administration of $181,977 to the funds for this year, the Senate committee has indicated its expectation of better administration of

the work of this department. Charges had been made to the effect that this Federal department had not been sufficiently strict in preventing the sale of substandard digitalis, ergot and ether. After investigation by a committee, Congress appeared to be satisfied that the Food and Drug department has been doing as well as possible under the conditions then existing but that an additional appropriation would be sufficient to bring about better results.

The increase in the food and drug industries of recent years has been great, amounting to more than 40 per cent. since 1914. Regulation and supervision will improve the results of the work of this department.

A COLLECTION OF EMBRYOS

Quietly reposing, sometimes in the personal safe of Dr. J. LeRoy Conel of Boston University's school of medicine faculty, and other times in the school safety vault, is the only known collection of embryos representing to medical research the lowest construction from which the human brain has been evolved. If you were to stroll into Boston University's School of Medicine, look upon a small private collection of approximately 100 specimens of Bdellostoma (sea eel) eggs, each one about the size of a kidney bean, you would probably fail to be impressed.

The fact is that this little group of 100 eggs of the Bdellostoma represents an invaluable collection which is being used in the study of the development of the internal structure of the brain. It is the only one in existence and outnumbers any collection previously discovered. To secure them, Dr. J. LeRoy Conel, professor of anatomy in the Boston University school of medicine, spent all last summer trawling every day with 1200 hooks about two miles off the coast of Monterey, Cal.

The importance of Dr. Conel's efforts and of the insignificant looking eggs with their embryos is that they represent the lowest living vertebrates in working out the evolution of the human brain. It is surprising that the five parts with the same functions as are found in the fully developed human brain, even the beginning of a cortical tissue, are to be seen here in this kind of sea eel. To date no one has described fully the development of the internal structure of the brain of Bdellostoma.

The only other collection of this kind was in possession of the late Dr. Bashford Dean, curator of fishes in the Natural History Museum, New York City, and also curator of armor in the Metropolitan Museum. Thirty years ago a Chinese fisherman laboriously gathered a group of about fifty embryos for Dr. Dean. These are now in the possession of Dr. Conel who has been engaged in research on this subject. The fisherman never would tell how or where he secured the eggs and when he died, his secret perished. Dr. Conel has devised a fishing system of his own, and succeeded in discovering where and how to collect the eggs.

This June he plans to go to Nova Scotia and search for the eggs of Myxine, Bdellostoma's first cousin, which is found only in Atlantic waters. Dr. Conel is authority for the fact that during the past 100 years European scientists have sought the eggs of this species unsuccessfully and with the expenditure of huge sums of money. In 1862 the Academy of Science in Copenhagen offered a prize to the discoverer, but so far the prize has gone unclaimed.

Dr. Conel's days last summer were occupied in sailing out about two miles from Monterey every morning. There the water varies from thirty to sixty fathoms in depth, and the choice Bdellostoma eggs which he sought lay on the ocean floor. With trawling lines of 1200 hooks baited with squid, he and his helpers fished. The system was to hook the slime eel. Once hooked the eel thrashed madly about in the lime until he was hauled to the surface. When he was pulled in, he was thick in slime from his frantic efforts to get free. In the slime were the embryos sought by Professor Conel in his scientific study of brain development. Out of 400 eggs which resulted from his summer's work, Dr. Conel secured about 100 that were fertilized and therefore useful for his investigations. The Myxine eel, found off the Atlantic coast, is closely related to the Bdellostoma and nearest like it.

Dr. Conel has been a member of Boston University's school of medicine faculty since July, 1923. He was graduated from Milliken University in 1912, received his M.A. from the University of Illinois in 1913 and his Ph.D. in 1916. He says that these eggs are invaluable to science in working out the evolution of the brain.

THE TRAINING OF HEALTH OFFICERS

In a recent report the United States Public Health Service emphasizes that the administrative health officer should be trained for his work. This training should cover fundamentals and afford an opportunity to acquire experience in the practical conduct of the work of a health department. A course of this type will necessitate a close coördination of a teaching institution and an administrative health organization. However, such training facilities are not likely to be used extensively unless a system is perfected which will provide means whereby training can be made readily available, and unless there be some provision for making training a qualification for employment and advancement. The State health department seems to be the agency best able to sponsor a plan of training; however, the actual teaching should be under the management of an educational institution such as a department of preventive medicine in a medical school or a school of hygiene. The local health agencies should coöperate, particularly for the purpose of making available their facilities for acquiring experience in practical public-health administration. An approach to the whole subject of training on a comprehensive basis was begun in Tennessee during the Spring of 1928 under the joint auspices of the department of preventive medicine of Vanderbilt Medical School and the Tennessee State Department of Public Health. Experience up to the present time indicates that it will be successful. A similar plan is under consideration in at least one other State. It should

be possible to adopt this plan or certain modifications of it in any State if the State health department participates in local health service and can affiliate with a teaching institution which is in position to assume responsibility for the administration of the course as well as a major part of the actual teaching.—*United States Public Health Service.*

CORRESPONDENCE

THE REVOCATION OF THE REGISTRATION OF DR. HARRY N. CARR

March 17, 1931.

Editor, *New England Journal of Medicine:*

This is to notify you that at a special meeting of the Board of Registration in Medicine on February 13, 1931, the Board voted that the license of Dr. Harry N. Carr of Southwick be revoked.

DR. FRANK M. VAUGHAN, *Secretary.*

THE DISTRIBUTION OF ANTIPNEUMOCOCCUS SERUM

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

March 17, 1931.

Editor, *New England Journal of Medicine:*

Because of the many requests from physicians and institutions for the concentrated pneumococcus antibody solution, I feel that, in order that the restrictions placed upon its distribution by this Department may be clearly understood, it is desirable at this time to state our present policy in regard to this product.

Although concentrated antipneumococcus serum appears to be of benefit in early cases of lobar pneumonia due to Pneumococcus, Type I, and to a somewhat less degree in cases due to Pneumococcus, Type II, its therapeutic use may still be considered in the experimental stage. As yet there are many questions to be solved concerning its use in treatment, and these problems can only be studied in hospitals possessing complete facilities for repeated determination of pneumococcus type, for blood counts and blood cultures and for other clinical and laboratory procedures. Furthermore, because of the present high cost of preparing this product, for reasons of economy alone, we feel that we should limit its use to those cases which can thus be controlled.

Plans are now being developed, under a grant from the Commonwealth Fund of New York City, for a thorough-going study of the pneumonia situation in this state, of the methods for producing antipneumococcic serum and the whole question of this type of serum therapy.

Therefore, for the present the distribution of this product must be limited to those hospitals which have been chosen to coöperate in this study.

Yours truly,

GEORGE H. BIGELOW, M.D.
Commissioner of Public Health.

RECENT DEATHS

GUNNING—DR. THOMAS FRANCIS GUNNING, died at his home in Fall River, March 17, 1931, aged 68.

He was a native of Newmarket, N. H., studied for a time at Boston College and took his M.D. at the University of Pennsylvania School of Medicine, Philadelphia, in 1891. Dr. Gunning had been a baseball player, having played with the Springfield, Illinois, club in 1883 and as catcher of the Boston Nationals in 1887. The following year he played with the Philadelphia Nationals and in 1889 with the Athletics. At one time he was medical examiner in the third Bristol District. He was a Fellow of the Massachusetts Medical Society and of the American Medical Association.

GAHAN—DR. PATRICK FRANCIS GAHAN, for 34 years a practicing physician of Medford, died of heart disease at his home in that city, March 18, 1931, aged 67 years.

Born in Holliston July 5, 1863 he was graduated from Jefferson Medical College, Philadelphia, in 1896 and began practice in Medford the following year. He helped to start the Lawrence Memorial Hospital in Medford, was on the first medical staff and a member of the corporation.

In 1905 and 1906 Dr. Gahan was city physician to Medford and from 1913 to 1916 trustee of the Medford Public Library. He was a fellow of the Massachusetts Medical Society and of the American Medical Association; a charter member of Medford lodge of Elks, a member of Medford Council, Knights of Columbus, Mystic Court, M. C. O. F., Charitable Irish Society and of the Holliston Historical Society, and Order of Red Men.

Dr. Gahan is survived by his widow, Mrs. Elizabeth J. Mannix Gahan and by three sons, all of them students of medicine, and by a daughter who is studying art at the School of the Boston Museum of Fine Arts.

GARIPAY—DR. ELLSWORTH PETER GARIPAY, of Lynn, died while undergoing an operation at the Carney Hospital, South Boston, March 19, 1931, at the age of 44. He was a graduate of Tufts College Medical School in 1911, joined the Massachusetts Medical Society in 1913, and established himself in practice in Lynn, where he devoted himself largely to the practice of obstetrics. He is survived by his widow and two children.

SULLIVAN—DR. JOHN THOMAS SULLIVAN of Dorchester died of pneumonia at the Boston City Hospital, February 7, 1931 at the age of 62.

He was a native of Nashua, N. H., where he was born May 24, 1868. He was a graduate of Dartmouth Medical School in 1893 and had practiced in Dorchester since 1907 when he joined the Massachusetts Medical Society.

OBITUARY

SAMUEL H. DURGIN, M.D.

Samuel H. Durgin, M.D., died March 6, 1931, at the advanced age of 93. He served his country in the Civil War and his State and City all the rest of his active life. It is impossible to estimate correctly the benefit which resulted from his work. Only those who knew the difficulties he had to face—the opposition he had to overcome—can appreciate what the State and City owe to his untiring spirit—his remarkable grasp of every situation—his determination to make Boston a safe place in which to live.

For more than a generation he guided the efforts of those who tried to free Boston of smallpox and keep it free—he led the fight against diphtheria and the other contagious diseases and he lived to see the South Department of the Boston City Hospital fulfill his hope that Boston might have one of the best hospitals in the country for the treatment of those diseases.

A friendship of nearly fifty years is ended and I am sure I am voicing the feeling of all who knew him when I say that he fought a good fight against every disease and will be remembered as one of the leaders who have done much for the City and State.

The members of his profession appreciated his work, marvelled at his foresight and have been helped by his teachings and example.

NEWS ITEMS

DR. MORRIS FISHBEIN DELIVERED AN ADDRESS IN BOSTON—On Sunday evening, March 22, Dr. Morris Fishbein, editor of the *Journal of the American Medical Association*, delivered an address on "Medical Fads and Quackery" in Ford Hall.

This was an able exposition of the weakness of human nature in its relation to the unsound varieties of medical practice.

THE STUDY OF THE CAUSE OF RELAPSING CASES OF MALARIA—The Gorgas Memorial Institute of Tropical Medicine is planning to use monkeys for experimental research on the problems incident to the recurrence of malaria. Dr. H. C. Clark, head of the institute, is trying to secure one thousand monkeys to be used by Dr. W. H. Taliafero, professor of parasitology at the University of Chicago, in the tests to be made.

One of the specific objects of the study is to find how to make quinine reach all parts of the body in order to rid the system of the plasmodium.

TWENTY THOUSAND DOLLARS FOR THE HARVARD MEDICAL SCHOOL—In the will of Mrs. Frieda Adler, filed for probate in New York, it is specified that $20,000 is to be offered to the Harvard Medical School to establish a prize for medical research known as the Isaac Adler prize.

If accepted, this sum is to be a permanent endowment to be invested and every three years the accumulated profits on the investment are to constitute a prize to be awarded to the person who has brought forward evidence of the best research in medicine or its allied sciences, either in the United States or Canada.

CLAIM FOR THE ISOLATION OF THE MALE SEX HORMONE—Doctors E. Dingmasse, J. Freud, S. Kober, A. E. Laqueur and A. P. W. Munch have presented their claim of discovery of the male sex hormone before the Royal Academy of Sciences of Amsterdam.

This hormone is found in the distillate of the glandular material in a nearly complete vacuum. Only very small quantities of the hormone have been secured and thus far doubt is expressed as to the possibility of producing sufficient amounts to meet pharmaceutic requirements.

NOTICES

IMPORTANCE OF CARE DURING PREGNANCY

Under the above heading an editorial appeared in the *Journal* of January 29, 1931, in which reference was made to the priority in prenatal work. We have since learned that there is a difference of opinion as to the date of the earliest prenatal work in this vicinity which has never been cleared up in the minds of groups interested in this type of service.

MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 P. M. on Thursday, April 2, in the Amphitheatre of the Peter Bent Brigham Hospital, a medical clinic will be given by Dr. Henry A. Christian, to which physicians are cordially invited. These clinics will be held regularly on Thursday afternoons.

DR. D. HAROLD WALKER CORRECTS A STATEMENT APPEARING IN A BOSTON NEWSPAPER

Dr. D. Harold Walker has informed this *Journal* that he is not associated with any person or persons regarding a clinic of any kind such as was expressed in an article which appeared in a Boston newspaper.

CORRECTION

In publishing the report of the committee referring to the recipients of the Bigelow Medal, there was an omission in that Dr. Chevalier Jackson was one of the honored group to receive this award which was presented to him by the Boston Surgical Society on October 10, 1928.

REPORTS AND NOTICES OF MEETINGS

DR. SAMUEL R. MEAKER ADDRESSES HARVEY SOCIETY

On Friday evening, March 13, Dr. Samuel R. Meaker, Professor of Gynecology at Boston University Medical School, addressed a large audience at the Beth Israel Hospital Auditorium on the subject, "The Social Aspect of Gynecology."

Dr. Louis E. Phaneuf, Professor of Gynecology at Tufts College Medical School, was chairman of the evening.

Dr. Meaker traced the history of gynecology back to the work of William Harvey. Although generally well known for his work on circulation few know that he had done a great deal in the field of obstetrics and gynecology. Simpson's work in 1843, and Sims' work in 1845 were also mentioned.

There have been definite eras in gynecology as classified according to the method of treatment. First, there was the medical era, when the treatment consisted mainly of drugs, pessaries, and palliative measures. The second era was almost entirely surgical and existed up until about twenty years ago. The last era which is the modern trend has gone through a therapeutic housecleaning throwing out many of the old methods of treatment and many obsolete drugs. New methods of diagnosis and treatment have evolved. Of great importance in this modern era is the trend to rational therapy, and prophylactic gynecology.

Gynecology as a whole embraces two great problems,—the welfare of the family, and the sociological aspect. Under these two great heads come contraception, prostitution, masturbation, perversion, venereal disease, sterility, insanity, abortions, late marriages, celibacy, etc.

Dr. Meaker discussed the pros and cons of contraception, emphasizing the economic factors among the poorer classes, selfish childless parents, premarital sexual promiscuity, and chronic constitutional diseases.

The problem of surgical sterilization, and the causes for this procedure are as follows: first, when there is local disease; second, as a prophylaxis, when chronic disease is present; third, economic and social reasons, and fourth, eugenic reasons.

The first and second causes are self-evident. When a local pathological condition, or a general constitutional disease, as tuberculosis, toxemia, cardiac conditions, etc., is present, it usually necessitates surgical sterilization. The third reason can be explained by a case of a laborer having fifteen children in fifteen years in spite of contraceptive measures. The eugenic reason is self-evident when one considers the feeble-minded, insane, and the like.

In many cases, Dr. Meaker suggests that the sterilization be done in the male rather than the female. The operation in the male is comparatively simple, in contrast to a formidable procedure in the female.

The social management of venereal disease needs a great deal of attention. The best method would be by controlling promiscuity (educating young people, eliminating prostitutes), isolation of cases, premarital examinations, and prevention of congenital disease.

The sex life of human beings is also of great importance. First, it is necessary for the propagation of the race, and secondly to make a true union. Sex life carried out properly leads to complete happiness and harmony in the home. The problems that arise in the sexual life of married people are due to ignorance of the sexual physiology, and from maladjustment. In the wife it is usually the result of premarital repressions, wrong impressions, and lack of adjustment. In the husband, it is usually plain ignorance of the subject. These all usually lead to neuroses, discontent, quarrels, and divorce. The great majority of the divorces today are mainly due to sex maladjustments. The treatment here is education of the parents, followed by education of all children as they mature.

Sterility is a national as well as a personal problem. In the orthodox Jewish church it is considered as one of the four great sins, and is a legal basis for divorce. Among the Chinese the importance of perpetuating the family name is especially desired.

Children stabilize a home and are important factors in preventing disruption of family ties. Adoptions have helped to cement cordial relations of husbands and wives, but only about one-third as many children suitable for adoption can be found as are desired. The cause of sterility may be found in the male, the female, or both.

Dr. Meaker suggests a program that would improve the social aspect of gynecology. Perhaps one of the most important is a reasonable educational program for girls. Other problems that must be encountered are the control of venereal disease, premarital examinations, premarital and postmarital advice clinics (as in Germany and Austria), rational treatment of gynecological cases, sterility problems placed in the hands of competent doctors and useless excitation of the female, which leads to congestion of the ovaries.

THE GEORGE WASHINGTON GAY LECTURE AT TUFTS MEDICAL SCHOOL

On Tuesday, March 3, at 4:00 P.M., Dr. Frank H. Washburn, of the Holden Clinic at Holden, Mass., delivered the annual George Washington Gay Lecture before a large audience at the Tufts College Medical School Amphitheater. The title of his address was "The Rôle of Ethical Conduct in the Successful Medical Career."

Dean A. Warren Stearns was chairman of the meeting.

This lecture, which is an annual event, is made possible through an endowment of George Washington Gay, the interest of which is used to sponsor a lecture of this type once a year.

Dr. Washburn opened his address by relating his experience with Dr. Gay at the City Hospital, when Dr. Gay was administering an ether anesthesia. In addition to explaining the technique of the ether administration, he pointed out how important it is to treat the mental aspect of a patient, especially the apprehensive types.

Dr. Washburn reviewed the ethics of medical conduct from the times of the ancient Greek philosophers to the modern period. He included a reading of the Hippocratic Oath as well as a discussion of it. In addition, he read the oath of the medical doctors of India, the Christian Doctor's Oath, and then led up to a discussion of the ethics of modern medical conduct as revised by the American Medical Association, by the American College of Surgeons, and the Massachusetts Medical Society.

The many problems that confront the young doctor going into practice were very interestingly presented, and the best method of treating them was recommended. Such problems included advertising, intemperance, abortion, birth control, fee splitting, professional relationships, consultations, use of drugs, relationship to nurses and pharmacists, dealing with workmen's compensations, automobile accidents, and other similar problems.

Dr. Washburn than gave a very fitting discourse to the students as Tufts men, and impressed the importance of personal appearance, general interest in medicine as evidenced by the use of journals and reference books, and conduct befitting a Tufts man and a professional medical man.

A SESSION OF THE HEALTH INSTITUTE

This organization conducted a three-day meeting March 16, 17 and 18 at the Y. M. C. A. Auditorium.

The Institute is under the auspices of the Massachusetts Tuberculosis League, the Massachusetts Department of Public Health and the Massachusetts Society for Social Hygiene.

The principal speaker was Mrs. Violet H. Hodgson, Assistant Director of the National Organization for Public Health Nursing, New York.

Mr. Frank Kiernan, Executive Secretary of the Massachusetts Tuberculosis League, presided at the opening exercises.

THE NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Society will be held at the Hotel Kenmore, March 31, 1931, at 8 P. M. Telephone Kenmore 2770.

Business.

Communication: "Circulatory Disorders of the Extremities Due to Arterial Insufficiency." Dr. Arthur W. Allen.

Discussion.

Collation.

FRANK S. CRUICKSHANK, M.D., *Secretary.*
47 Bay State Road.

CATHOLIC HOSPITAL ASSOCIATION

The Sixteenth Annual Convention of the Catholic Hospital Association of the United States and Canada will be held at the College of St. Thomas, St. Paul., Minn., June 16 to 19, 1931.

CARDIAC COURSE

The sixth meeting of the Cardiac Course of the New England Heart Association will be held in John Ware Hall at the Boston Medical Library on Wednesday afternoon, April 1, at four-thirty.

Blood Flow and Functional Tests of Physical Fitness and of the Circulation.

1. Blood Flow. Dr. Hermann Blumgart, Beth Israel Hospital, Boston.
2. Tests of Physical Fitness. Dr. Arlie V. Bock, Massachusetts General Hospital, Boston.
3. Functional Tests in Insurance Examination. Dr. Harold Frost, New England Mutual Life Insurance Company, Boston.
4. Discussion to be opened by Dr. Joseph H. Pratt, Boston.

PAUL D. WHITE, M.D.

THE NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The New England Obstetrical and Gynecological Society will have its next meeting in Boston, Mass., April 22, 1931. The meeting will consist of clinics at the various hospitals during the day with a luncheon at noon at the University Club.

A dinner will be held in the evening at the University Club and Dr. A. Warren Stearns, Dean of Tufts Medical School and Commissioner of Correction of the State of Massachusetts, will be the principal speaker.

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

The Essex South District Medical Society will hold its Annual Meeting, Tuesday, May 12, 1931, at the Tavern, Gloucester.

A Medical Pageant will be presented by Tufts College Medical School, Department of Medical History, Benjamin Spector, M.D., Associate Professor of Anatomy, director. The characters which will be represented are as follows: Hippocrates, Moses Maimonides, Andreas Vesalius, Ambroise Paré, William Harvey, Thomas Sydenham, Louis Pasteur, Joseph Lister, Paul Ehrlich. Each player will be costumed and made up to represent faithfully the character which he portrays, and will give about a five-minute sketch of his life and contribution to medicine.

ANNUAL MEETING OF THE AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The meeting will be held in Kansas City, Missouri, April 7, 8, 9, 1931, at the Hotel President, Kansas City, Missouri.

THE DELTA OMEGA LECTURE AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, DEPARTMENT OF BIOLOGY AND PUBLIC HEALTH

Invitations to attend the Fourth Massachusetts Institute of Technology Delta Omega Lecture have been issued.

Time: Friday, April 3, 1931 at 5:00 P. M.

Place: Room 10-250, at the Massachusetts Institute of Technology in Cambridge.

Subject: The U. S. Army Medical Corps and Its Relation to Public Health in the United States.

Speaker: E. E. Hume, M.D., Dr.P.H., Colonel, U. S. Army Medical Corps.

This lecture is open to all who are interested.

THE BOSTON CITY HOSPITAL

POSTPONEMENT OF THE BOSTON CITY HOSPITAL CLINICAL MEETING

The Boston City Hospital clinical meeting has been postponed from March 25 to Wednesday, April 1, 1931, at 8.15 P.M.

OTTO J. HERMANN, *Chairman Committee on Clinics.*

ESSEX NORTH DISTRICT MEDICAL SOCIETY

Next meeting: Amesbury Country Club, Amesbury, May 13, 1931; dinner at 12.30. Speakers, Wm. H. Ross, President, New York State Medical Society, "A Medical Society's Public Relations Committee at Work."

Wm. J. French, Medical Director Commonwealth Fund, New York, "Fellowship Grants to Doctors in Rural Communities."

SOCIETY MEETINGS
CONGRESSES AND CONFERENCES

March 30—Lecture on Keeping Mentally Fit. Given under the auspices of the Massachusetts Division of University Extension and the Massachusetts Society for Mental Hygiene. Boston.
In the Gardner Auditorium, State House, Boston.
Course Leader: Dr. Henry B. Elkind, Medical Director, Massachusetts Society for Mental Hygiene.

March 30—"Nerves"; Their Meaning in Our Lives. E. van Norman Emery, M.D., Medical Director, Connecticut Society for Mental Hygiene.

March 27—Belmont Medical Society. See page 577, issue of March 12.

April 1—Cardiac Course. See page 690.

April 1—Postponement of the Boston City Hospital Clinical Meeting. See notice above.

April 2—Medical Clinic at the Peter Bent Brigham Hospital. See page 688.

April 3—The Delta Omega Lecture. See page 690.

April 7, 8, 9—Annual Meeting of the American Association for the Study of Goiter. See page 690.

April 8—New England Dermatological Society. See page 632, issue of March 19.

April 10—The William Harvey Society. See page 471, issue of February 26.

April 22—The New England Obstetrical and Gynecological Society. See page 690.

May 11-14—Meeting of the National Tuberculosis Association at Syracuse. See page 1310, issue of December 25.

June 8-14—International Hospital Congress. See page 521, issue of March 5.

June 16-19—Catholic Hospital Association. See page 690.

July 6-11—Medical Clinic, Paris. See page 520, issue of March 5.

July 26-31—Third Congress of the Pan American Medical Association. See page 632, issue of March 19.

July 27-31—Third International Congress of Radiology, Paris. Complete notice appears on page 385, issue of August 21.

September 14-17—The American Public Health Association. See page 632, issue of March 19.

DISTRICT MEDICAL SOCIETIES

Bristol North District Medical Society

April 16—Taunton Woman's Club.
September 17.

Essex North District Medical Society

May 13—See notice above.

Essex South District Medical Society

Thursday, May 7—Censors meet at Salem Hospital at 3:30 P. M.

Tuesday, May 12—See page 690.

Franklin District Medical Society

May—The meeting will be held on the second Tuesday of May at 11 A. M. at the Weldon Hotel, Greenfield.

Middlesex East District Medical Society

May 13—At Wakefield.

Norfolk District Medical Society

March 31—See page 690.

May—Annual Meeting. Date and details to be announced.

May 7—Censors' Meeting for examination of candidates at 171 Warren Street, Roxbury, 4 P. M. Candidates from schools on accepted list will forward application with certificate of graduation to the secretary at least one week prior to date of examination. Candidates from schools not on accepted list who have been in practice five years will forward applications together with five letters of recommendation from members in good standing in the Massachusetts Medical Society to Dr. P. P. Johnson, Cabot Street, Beverly, Mass., two weeks prior to date of examination. Fee for all candidates $10.00.

FRANK S. CRUICKSHANK, Secretary.

Norfolk South District Medical Society

Spring meetings are as follows:
April 2, May 7.
All meetings begin at 12 noon. Meetings will be held at the Norfolk County Hospital, South Braintree.

The censors will meet on May 7 at 11:30 A. M. at the Norfolk County Hospital, South Braintree.

NATHAN R. PILLSBURY, Secretary.

Suffolk District Medical Society

April 29—Combined meeting with the Boston Medical Library. This meeting will be held at 8:15 P. M. Election of Officers.
The medical profession is cordially invited to attend this meeting.

GEORGE S. DERBY, M.D.,
President, Suffolk District Medical Society.
LELAND S. McKITTRICK, M.D.,
Secretary, Suffolk District Medical Society.
HILBERT F. DAY, M.D.,
Boston Medical Library.

BOOK REVIEW

Clinical Allergy Particularly Asthma and Hay Fever. Mechanism and Treatment. FRANCIS M. RACKEMANN, M.D. The Macmillan Company, New York, 1931, $10.50.

There is great need for just such a book as this. The field of immunology has broadened so rapidly and it has come to include so many conditions of hitherto unknown etiology that only those specially trained in this science have been able to follow intelligently the large literature that has arisen. Furthermore, until the present there has existed no critical review of the many and varied publications that have appeared, and the physician, unless he has had a basic education in bacteriology, serology and immunology has been unable to place any true value upon the observations reported or upon the recommended methods for specific diagnosis and treatment.

The foreword by Zinsser is a brief but condensed and particularly lucid exposition of the fundamental conceptions of hypersensitiveness. The book contains admirable chapters on anaphylaxis in man, on bacterial allergy, on the nature and origin, and the chemistry, immunology and diagnosis of hypersensitiveness which present to the reader clear, orderly and full discussions of the nature of the various vital factors upon which all diagnosis and treatment must depend. There are equally good chapters on the clinical manifestations of allergy including the under-

lying immunologic reactions, the diagnosis of such conditions as hypersensitiveness to horse serum, to pollen proteins (hay fever) and to food proteins, asthma in its various manifestations, urticaria, erythema and angioneurotic edema.

One might differ with the author as to the soundness of designating vasomotor rhinitis as "perennial hay fever" because there is no doubt that many cases of this type of rhinitis are probably due to some condition other than allergy. This chapter and the one on migraine and eczema, while containing sound observation and conservative analysis include a considerable amount of speculation. With many patients of this class, several forms of treatment, such as desensitization, change of environment and removal of suspected causes, et cetera, have been employed so that it is impossible to determine the real cause of the condition or to place the proper value on any single form of therapy. Our present knowledge of some of these conditions is so incomplete that, while theorizing is permissible and desirable, the inclination to ascribe all these conditions to allergy should be avoided. Here, before including under allergic disease, diseases of unknown etiology one should consider carefully the five characteristics of allergic individuals which the author wisely and frequently repeats throughout the book.

The author has brought into this volume careful and intelligent abstracts of practically all the important publications that pertain to the subject, and in this work alone he has done a great service. This knowledge is supplemented by observations, conclusions and recommendations drawn from the author's wide and rich experience.

All physicians administering antitoxins and other serums may read with profit the chapter, "Reactions of Man to Foreign Serum." Such a reading will do much to correct the very unfortunate and incorrect description of anaphylaxis in man on Page 27. Here the author describes the train of symptoms of acute anaphylactic shock and states that in "numbers of cases" these symptoms may follow a *second* injection of serum. As a matter of fact, these immediate and serious reactions occur more often after first injections of serum but even then they are fortunately rare, Park reporting only two such reactions (both non-fatal) in thirty thousand patients treated with serum. These reactions take place even less often after repeated injections and still more rarely, if ever, after *second* injections.

In the chapter on "Hay Fever" (p. 266), there is a useful summary of the geographic distribution of the various pollens responsible for this disease and in Appendix A, there is a long and essentially a complete list of all foreign substances proved to be causes of allergic manifestations.

The book is so wholly praiseworthy there is little that lends itself to unfavorable criticism. One might wonder that of the many papers that have appeared describing allergic manifestations following stings by bees, wasps, hornets and scorpions, there are only three references and almost no discussion, and one might wish an opinion on the employment of an artificially induced allergic condition in the treatment of purpura. The use of capitals in spelling of the scientific names of bacteria does not conform to modern usage and in one or two instances such names are needlessly in quotation marks. Typographical and other errors are few and are negligible in view of the general excellence of the text. The one weak part is the index, which unfortunately is so incomplete as to be of limited value to the reader.

On the other hand, the author's style is clear and distinctly readable; his discussions are logical, conservative and based on a discriminating use of proven fact; his directions for diagnosis and treatment are first hand and have the support of the author's own valuable experience; and he has included the most recent references available at the time of writing. The book is quite up to date. The type, the paper and the binding leave nothing to be desired and the whole make-up of the book is one of quiet elegance.

Doctor Rackemann, therefore, has rendered medical students, immunologists and physicians in many branches of medicine a signal service in bringing to them in admirable form our present-day knowledge of hypersensitiveness, its manifestations in human beings and the diagnosis and treatment of its various forms. We can give this book a hearty recommendation.

BOOKS RECEIVED FOR REVIEW

An Introduction to Pharmacology and Therapeutics by J. A. Gunn. Second Edition. Published by Humphrey Milford, Oxford University Press. 233 Pages. Price $1.50.

The Treatment of Chronic Deafness by the Electrophonoïde Method of Zünd-Burguet by George C. Cathcart. Second Edition. Published by Humphrey Milford, Oxford University Press. 111 Pages. Price $1.50.

The History of Paediatrics by George Frederic Still. Published by Humphrey Milford, Oxford University Press. 526 Pages. Price $8.00.

The Surgical Clinics of North America. February, 1931. Volume 11, Number 1. Chicago Number. Published by W. B. Saunders Company. 226 Pages.

Selections from The Papers and Speeches of John Chalmers DaCosta. Published by W. B. Saunders Company. 440 Pages. Price $6.50.

Textbook of Human Embryology by Cleveland Sylvester Simkins. Published by F. A. Davis Company. 469 Pages. Price $4.50.

The Inborn Factors in Disease. An Essay. By Archibald E. Garrod. Published at the Clarendon Press. 160 Pages. Price $2.75.

Facts and Figures About Tuberculosis. Compiled by Jessamine S. Whitney. Published by the National Tuberculosis Association. 63 Pages. Price $.75 for paper cover and $1.00 in flexible fabrikoid.

Studies from The Rockefeller Institute for Medical Research. Reprints. Volume 74. Published by The Rockefeller Institute for Medical Research. 587 Pages.